

Review: Microsoft Combat Flight Sim & Sierra ProPilot 99

Full Throttle

Pushing The Envelope Of Flight Simulation!

December/January 1998

Volume 5 Number 6

USA \$7.95

REVIEWS

CoPilot
The Planes of Airbus
Air Force One

Flight Sim
Buyers Guide

Holiday Gift Buying
Made Easy

Round Robin
Adventure

Set Your Instruments & Fly
This Full Throttle Adventure

INTERVIEW

Jim Rhoads Interviews
Aerobatics Ace

Sean Tucker



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And now you've got one in Microsoft Flight Simulator 98, an upgrade guaranteed to blow all past flying experiences out of the sky. With it you'll soar over vastly improved landscapes that include 3000 airports (10 times more than the

previous version) and more than 45 cities around the world.

Flight Simulator 98 features multiplayer, force feedback support and flight models validated by Cessna® and Learjet,

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Your coordinates for take-off are www.microsoft.com/games/fsim

Full Throttle

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Dear Flight SimReader,



The December-January issue marks the end of year one. Yes, it was just last December that we acquired *Full Throttle* from Ziff-Davis and The Cobb Group. Things were quite hectic for us during the first three or four months of 1998, but have since calmed down.

The crew at *Full Throttle* and parent company Abacus has a significant amount of experience in flight simulation. And although Abacus has more than twenty years of experience on the book publishing side of things, we've invested countless hours learning the magazine publishing business. We hope that our learning experience hasn't distracted you from enjoying the articles about flight simulation and aviation.

Our staff is proud of the new look and in depth content. We're keeping our ears open to your feedback. We've heard from you that you want more new products information and reviews. You like the "how-to" articles, coverage of air shows and conventions and articles that show how flight simulation fits into the big picture of general aviation. Based on your letters and e-mail, we'll continue to bring you more in upcoming issues.

You may not know it, but each of you has the chance to vote. How? By voicing your opinion. Tell us what you want to read in upcoming issues of *Full Throttle*.

You can vote on our Website — click VOTE — or you can vote by dropping us a letter. We want to hear from you.

It's too easy to spout off and make a few off-the-cuff predictions about the future of flight sim, so I'll spare you. However, Managing Editor Tim Dickens reminded me that flight simulation is becoming even more fascinating. "With faster processors, fantastic 3-D video graphics, "dirt cheap" high capacity hard drives, authentic flight controls and innovative software development we're going to see such a wide choice of products in the next year," says Tim.

A look at this issue's *Santa's FBO* article shows you that we've already started along this path. No previous time have so many product choices available for flight simmers. Stay tuned to an exciting 1999. And Happy Holidays from the crew at *Full Throttle*.

Arnie Lee
Publisher

Pilot's Note: This information is not intended for use in actual flying situations. While the information is as realistic as possible, you should not use it for actual flying instruction. *Safe flying!*

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Full Throttle Interviews the Ambassador of Aerobatics ... Sean D. Tucker 28

Everyone who sees Sean Tucker, the Ambassador of Aerobatics, perform walks away amazed and bewildered at how he makes his airplane do what it does. It is as if he has a license to break all the laws of physics or as if he controls them himself. Find out more about his amazing flying abilities in this interview.

A Look At ProPilot 99 34

Pro Pilot 99 is poised to be the only general aviation simulator ready to launch for the 1998 fall/Christmas season. We'll take a close look at Pro Pilot 99 in this issue.

Round Robin Adventure #4 41

It's a great time of the year to take a trip through the Caribbean. You'll fly from the Bahamas to Cuba and back to the Bahamas.

Virtual Flight Training: Point to Point Navigation 45

This column looks at the development of navigation and flight planning from the earliest days of biplanes with road maps in the cockpit to the latest jet airways. This issue looks at the VOR (Very high frequency Omni-directional Radio-range).

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Santa's FBO 57

What's Santa going to deliver to flight simmers this season? We'll look at the hardware, software publications, accessories and more that can enhance your flight simulation experience.

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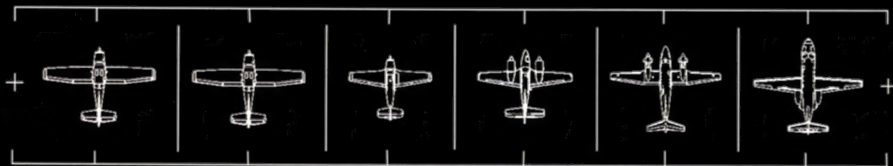


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www.propilot99.com

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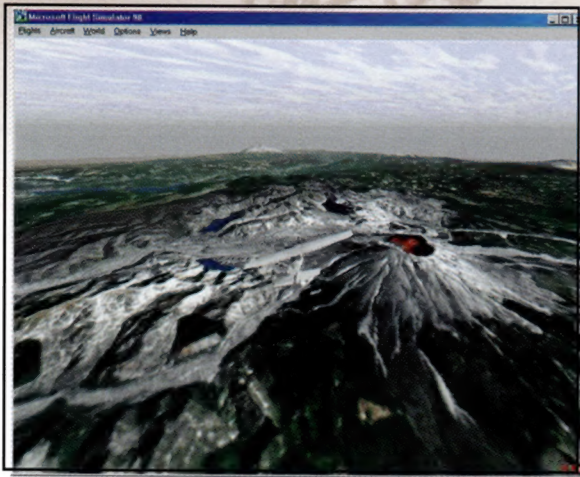


NOTAMS: New Products

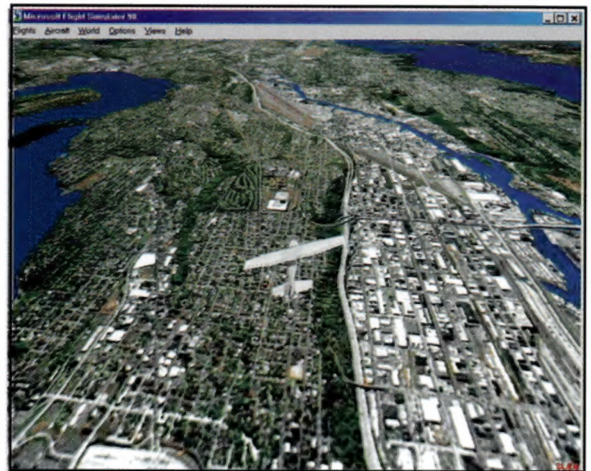
MegaScenery USA 98 **Pacific Northwest USA**

Flight Simulator pilots will be able to soar within feet of Washington state's famous landmarks including Mt. Rainier, Lake Chelan, Mt. Adams and Mt. Hood. Fly over hundreds of miles of the Columbia River, the western coastline, the Wenatchee, Okanogan and Olympic mountain ranges.

Pilots will be able to explore the hundreds of square miles of remnant debris surrounding the "once-angry" Mt. St. Helens, complete with crater.



Pilots can also fly over the hi-res recreations of the cities of Seattle, Portland and Vancouver (Canada), all captured in five-meters-per-pixel photorealistic resolution, plus a full set of color charts for navigating the scenery.



**MegaScenery
USA 98
Pacific
Northwest USA**

MegaScenery USA 98
Pacific Northwest USA
The PC Aviator Pty Ltd.
Suite 6
219 Balaclava Rd
North Caulfield, Victoria, 3161, Australia
USA Phone: 1-800-807-747
Fax: 03-9532-8916
<http://pcaviator.com.au/pacnw.htm>
SRP: \$49.95

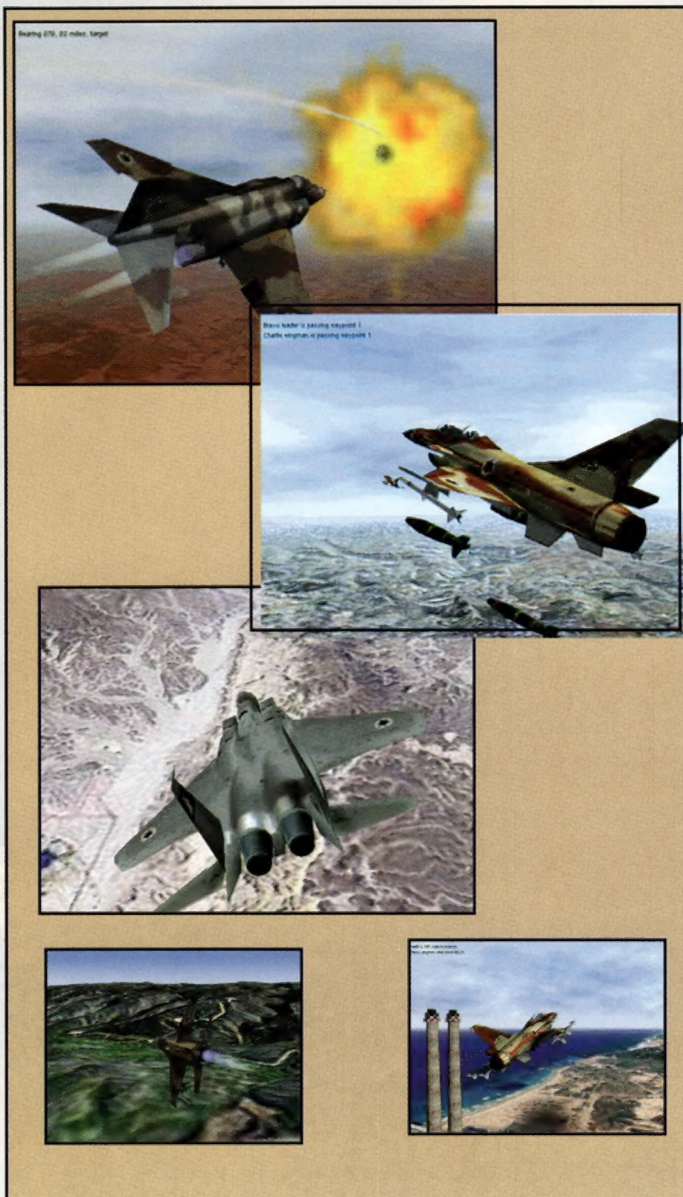
For those of you who aren't familiar with the term, NOTAMS is an acronym for NOTices to AirMen. The U.S. Government issues NOTAMS regularly. This issue of Full Throttle includes our version of NOTAMS — an expanded new products section. It's a regular part of our magazine. The products listed are compiled from press releases and information provided by the respective authors and companies who supply the products. We've taken steps to verify the information with each author or company, but cannot be responsible for inaccurate features, specification or availability dates.

IAF - Israeli Air Force

Janes Israeli Airforce lets you dogfight through canyons at low altitude with fast gameplay and great graphic detail.

Fly the real Israeli planes with accurate avionics, realistic cockpits and detailed 3-D shapes. Terrain detail using real stereoscopic satellite data at 10m/pixel, with true terrain elevation and coloring.

CD streaming terrain provides fast gameplay with no polygon breakage/tearing. Seven aircraft are modeled: Phantom F4-E, Phantom 2000, F-15 2000, F-16D, Kfir C-7, Lavi ATF and Mirage III (plus the MiG-23 and MiG-29 for multiplayer).



Six campaigns (a total of 42 missions)—three historical and three hypothetical. Variety of multiplayer modes includes head-to-head, cooperative and team vs team missions.

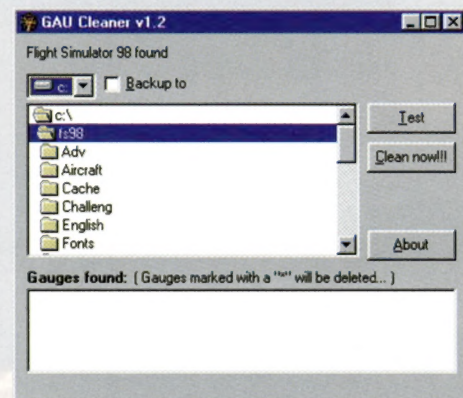
IAF - Israeli Air Force

Janes IAF
Electronic Arts
1450 Fashion Island Blvd.
San Mateo, CA 94404-2064
Internet: <http://www.janes.ea.com>
SRP: \$50.00

GAU Cleaner 1.3

Unused Gauge Cleaning Utility

If you are like many other simmers, you want to try the new panels that show up on the Net from time to time. The problem is that it's easy to forget what associated gauges also need to be removed when you remove the panel. Your life just got easier thanks to Nicola Marango. **GUA Cleaner 1.3** identifies unused gauges and removes them from your system. You can make a backup of your gauges by simply selecting the backup checkbox.



GAU Cleaner
1.2

Nicola Marango
Internet:
www.geocities.com/SiliconValley/7097
Freeware 24k

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Vancouver



Columbia River



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MegaScenery USA 98 Pacific Northwest is the first in a series of the most photorealistic scenery expansions ever created for Microsoft Flight Simulator. **Pacific Northwest USA** has the largest expanse of scenery you will ever see, covering a stunning **75,000 square miles** of the most picturesque landscapes of that region.

Published by

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The Flight Simulation Company

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and **Combat** Flight Simulator



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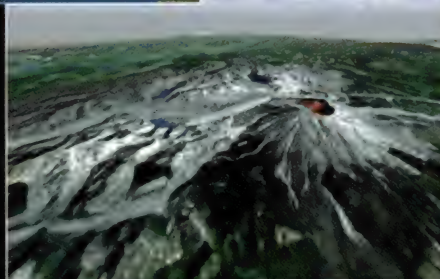
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Mount Helens



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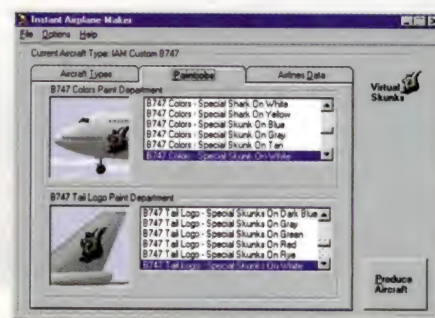
New generation aircraft and custom texturing tool

Abacus and The Virtual Skunks have teamed to bring you an exciting new package: **Instant Airplane Maker**.

The Virtual Skunks are legendary among flight simmers. Now, using their unique skills and some very innovative sampling techniques and high-end graphics modeling, the Virtual Skunks are building a new generation of flight sim aircraft with unrivaled features, including:

- Smooth, rounded surfaces
- Movable flaps
- Animated landing gear
- Illuminated landing lights
- Transparent windows
- More textured surfaces
- Excellent 3-D rendition
- Aircraft include freight and passenger versions of:
 - Airbus A319-114
 - Airbus A320-211
 - Airbus A321-111, 114
 - Boeing 747-400
 - McDonnell Douglas DC-9-30

Use Instant Airplane Maker to produce personalized versions of these aircraft in just seconds. Just pick one of the exciting models, choose a paint scheme, add a tail logo, type the name of your new airliner and you're ready to fly! In just a few clicks, you'll be off the ground in your new "next generation airplane." In an instant you've made your own customized airplane.



Instant Airplane Maker

Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
Phone: 800-451-4319
Fax: 616-698-0325
Internet: www.abacuspublish.com
E-mail: sales@abacuspublish.com
SRP: \$39.95

WinZip 7.0

Archive Utility

Every avid flight simmer has to deal with compressed files from time to time, and **WinZip 7.0** is one of the best tools available for compressing and extracting these files. WinZip features built-in support for popular Internet file formats, including TAR, gzip, Unix compress, UUencode, BinHex and MIME. ARJ, LZH and ARC files are supported via external programs. WinZip also interfaces to most virus scanners.

You can download a fully functional evaluation version at Nico Mak's Web site.



WinZip 7.0

Nico Mak Computing, Inc.
P.O. Box 540
Mansfield, CT 06268
Internet: www.winzip.com
Price: \$29.00



FlightSim Yoke

CH Products has announced a new **FlightSim Yoke** that should be available in the first quarter of 1999. The new FlightSim Yoke will come in both gameport and a USB version.

The USB version will come equipped with separate throttle, prop and mixture levers for a more realistic sim experience.



FlightSim Yoke

CH Products Corporate Headquarters
970 Park Center Drive
Vista, CA 92083
Phone: 760-598-2518
Fax: 760-598-2524
Internet: www.chproducts.com/index.html

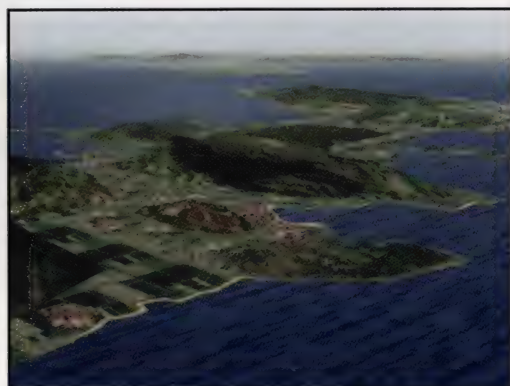
Italy 98

Scenery of Italy

This new Italian scenery package by Lago lets you tour the beautiful, historic countryside of Italy. Italy 98 covers the entire territory of Italy (over 300,000 square kilometers), including Sicily, Sardina and other islands, and includes every Italian airport—over 130 in all. View 140 historic buildings and famous sights from the air, accurately placed and reproduced. All nav aids, approach charts and maps are included in this package.

Italy 98

Lago SNC
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E-mail: 100411.3660@compuserve.com
SRP: \$49.95

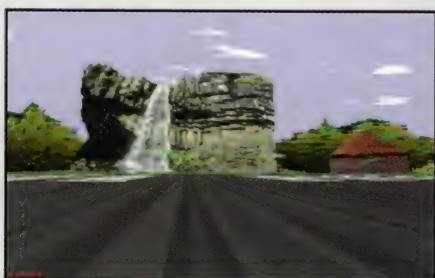


Munkworks

Aviator Theme Park

Tired of flying the same old grind? Looking for something different? Munkworks Aviator Theme Park scenery package includes four unique theme scenery areas.

- Munk Jungle
Island scenery including trees, animals, waterfall, etc.
- Munk Sand
An ocean area obstacle course, with many surprises.
- Munk Canyon
Canyon flying.
- Munk Metry
Another obstacle course filled with pyramids and boxes.



Download a preview of the scenery at the Munkworks Webpage.

Aviator Theme Park

Munkworks

Pierre G. Le Blanc

Internet: <http://pages.infinit.net/@8xNLahUAZgsGhiuD/munk/>

Price: \$25.00

The Golden Wings Hanger

Golden Age of Aviation

As a member of Golden Wings, you can fly your modern aircraft in your regular FS98 and travel back in time to that magic era in Golden Wings.

Membership includes the GW conversion, monthly newsletter with tips and member input, as well as frequent new vintage aircraft and scenery enhancements just for GW members.

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New, more realistic cloud textures, a correct, new moon and many custom flights give you the feel of being there.



Golden Wings

Bill Lyons

Golden Wings

P.O. Box 10395

Moline, Illinois 61266

<http://members.xoom.com/GOLDENWINGS/>

Price: \$19.95 membership 5.3 MB



Ultimate Private Pilot Kit Gleim publications extends offer

Gleim publications is extending their offer for Full Throttle readers who would like to expand their horizons and begin actual pilot training.



Gleim Publications, Inc., renowned leader in aviation training, is now shipping a new **Private Pilot Kit**, which includes practically everything a student pilot needs to pass the private pilot knowledge and flight tests! Gleim's Private Pilot books and software, including a combined syllabus/logbook, a FAR/AIM reprint, a flight computer and a navigational plotter, are packaged in an attractive, durable, all-purpose flight bag. According to Irvin Gleim, all student pilots who buy the Gleim kit will only have to purchase a local sectional chart and an airport/facility directory. Other than that, the only things missing from the kit are an airplane and a flight instructor.

Gleim's kit also comes in at a great price: just \$99.95. For an additional \$20, student pilots can upgrade the software in the kit to Gleim's brand-new CD-ROM version.

The Private Pilot Kit is available at your local FBO or call (800) 87-GLEIM for publisher-direct service. You should also check out their website (www.gleim.com).

Flight Simulator Pocket Assistant V1.4 beta

Flight Utility Collection

Assistant is a collection of utilities that perform many useful functions during flight planning and during flight. Included utilities are:

- Enroute calculator
- Character calculation
- Navigation form creator
- Fuel usage calculator
- IAS/TAS Converter
- Sound changer
- Calculator and Notepad Utilities
- Fahrenheit/Celsius Converter
- Distance Conversion
- Squawk Code Generator
- Top-of-Descent Calculator
- Top-of-Climb Calculator
- FPM Calculator

Some utilities are disabled until registering the program (but registering is free).



Flight Simulator Pocket Assistant

Christopher Vig
<ftp://ftp.iup.edu/flight-sim/uploads/fspa-v14.zip>
 Free registration

VIP Classic Wings 98 Volume II

Aircraft Panel, Sound and Scenery Expansion Kit for MS Flight-Sim 98

VIP has done it again with volume II of their popular Classic wings expansion kit.

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VIP Classic Wings 98 Volume II

Kenneth J. Kerr (VIP)
 3500 South Millway, Unit 52
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Navigation

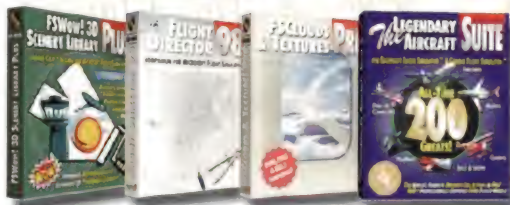
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Weather Conditions

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The FS Career Kit's integrated speech-based ATC evaluates pilot skills, grading performance and tracking cumulative totals and a virtual salary.

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FLIGHT 1
SOFTWARE

Full Throttle Looks At **MICROSOFT COMBAT FLIGHT SIMULATOR**



By Tim Dickens



functional gauges and panels, realistic and expandable scenery, and the advanced aircraft flight models that the civilian simulators and their third-party developers had to offer.

With every new generation of MSFS, the word among the PC simming community has been, "This is a real improvement over the previous version. Now if they would only put some guns on this thing and give us some targets to shoot at, too." Microsoft has finally stepped into the arena of combat *simulation*. This isn't another miniaturized arcade game for the PC, but a full-fledged flight simulator with the combat features that military aviation enthusiasts, such as myself, have yearned for.

What is Combat Flight Simulator?

Combat Flight Simulator (CFS) is Microsoft's first endeavor into the realm of military flight simulation, and with its release in early November, they have changed the face of PC flight simulators. Based on feedback and focus groups conducted with flight sim users, Microsoft has been working for two years to create this new product.

In a nutshell, CFS is an aerial combat simulator set in Europe during World War II. It is based on the well-known and proven MSFS simulator engine. Previous users of MSFS will immediately feel right at home inside the cockpit, as most of the controls, operating systems and menus are either identical or very similar to Flight Simulator 98 (FS 98). In fact, when I first installed the program, the first thing I did, before reading any material, was select *Fly Now/Free Flight* and take off in a Spitfire MKI. I had absolutely no problem taking off, pulling the gear up and leisurely flying around the beautifully sculptured landscape of southern England.

So is CFS a game? Is it a simulator? Well, it's both. If we follow Webster's definition of what a *game* is, "*A contest for recreation or prizes, played according to rules, depending on strength, luck or skill to win,*" then yes, it is a game. But it incorporates these attributes within the environment of a complete working flight simulator, which has many close similarities and differences to FS 98. Therefore, in my view, it is the world's first PC *military flight simulator*.

With this article, we hope to show you what these similarities and differences are, exactly how the simulator works, and what the combat aspects are like. Hopefully, this will give you a head start in understanding what CFS is all about.

Installation

Installation was smooth and uneventful. A full installation on the hard drive requires 198 MB of space. After full installation, there is no need to keep the CD in the drive. There is also a custom install option for the do-it-yourself crowd.

As an avid flight simulation hobbyist and a fan of Microsoft Flight Simulator (MSFS) since its inception over 15 years ago, I have always found one very important element missing. This element of flight is germane to real military aviation. Let's face it, I mean the ability to shoot at things and blow them up!

Every aviation enthusiast knows that military flight has been a large part of the rich heritage that began on that cold December day in 1903 at Kitty Hawk, North Carolina, when the Wright brothers made their first sustained flight. But when it came to virtual aviation, the world of flight has always been segregated into two different categories: civilian (general aviation) simulators and combat games.

The air combat games have always been available to satiate the PC enthusiast's intrinsic need for the challenge of combat, to face the enemy one-on-one and pit his skills against a competitor. But these games have always been lacking the realistic simulation of flight, including reproduction of the aircraft's operating systems,

A Look At Microsoft Combat Flight Simulator

Manual and Documentation

The 184-page manual was a welcome addition to the program and a marked improvement to the printed material that came with the last two versions of MSFS. I was glad to see that extensive documentation has once again been included with an MS simulator program. The manual includes operating instructions, description and background of the missions and campaigns, a basic combat flight school, and some entertaining World War II-era cartoons. A comprehensive glossary and index is also included.

The Simulator

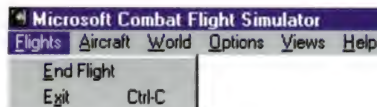
As I mentioned, FS 98 users will feel right at home operating ACFS. At the heart of any computer software is the menu system. This will immediately look familiar.



Lets take a closer look at them briefly.

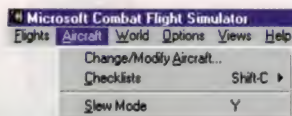
Flights menu

This is much simpler than FS 98. Since there are no Adventures and the Situations found in FS 98 correspond to the missions and campaigns in CFS, this is a very short menu.



Aircraft menu

Since there are no autopilot or nav aids to deal with, a simplified menu is found here as well. The remaining aircraft functions are incorporated on the **Change Aircraft** submenu, including the amount of ammunition and fuel on board.

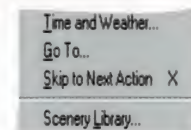


The slew mode works pretty much the same way as in FS 98. However, there is no "pause on task switch" option here, so the simulator won't run in the background if you switch to another program. This is probably so that an enemy aircraft will not blow you away while you leave momentarily to check your e-mail.

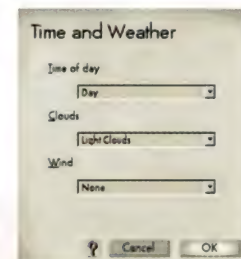


World menu

Again, this is simplified, since the MSFS dynamic objects are now replaced by the artificial intelligence of the program that provides all of the other planes in the air. Time and season and the basic MSFS scenery library work exactly the same way here. I have to say that I was disappointed with the weather setup options. It has no advanced weather dialog box, as in FS 98.



Instead, a highly simplified weather menu is provided but does not allow for varying cloud types, cloud/wind layers, weather areas, etc. This is one of the few negatives I have found in CFS.

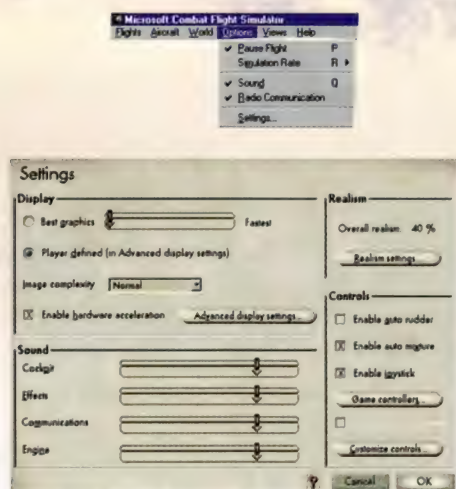


Options menu

Since the sound options are incorporated on the **Settings** submenu, this menu is once again small.



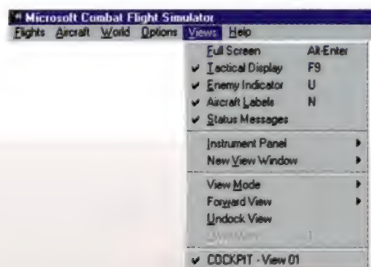
A Look At Microsoft Combat Flight Simulator



The display/3-D options are the same as in FS 98 and are in the **Settings** submenu as well. As is the case with FS 98, CFS will remember your display configuration/window settings after you exit for your next session. The few instrumentation options left (without the navigation radio instruments) can also be found in the **Settings** submenu.

Views menu

Tactical and aircraft label/combat related criteria are added here. The spot view options are simpler here. Control of the spot angle is accomplished with the number pad. The spot view distance control is missing, which would have been nice to have as it is in FS 98.



Recommended Hardware

With respect to the amount of computer power required, CFS runs very smooth on the 233 MHz K6-chip system I used for testing. In fact, it is smoother than FS98, so I must assume that the design team at MS has made some improvements in this arena. It would be safe to say that anything above a P166 will run this program quite well, with even better performance on the faster, high-end systems, of course. The video system utilized is much more important. The Diamond Stealth 220S with 4 MB of video memory I used for testing performed adequately, but I did experience moments of ground textures dropping out when performing high-speed aerobatic maneuvers during dogfights. I observed frame rates

between 12-20 fps, which is about how this system performs in FS 98 with medium-dense designed scenery (not to be confused with the complexity setting in the FS menu). This makes sense, given the dramatically advanced scenery design incorporated within CFS, which I will discuss later.

I also strongly recommend a good fighter-style joystick and a set of quality rudder pedals. The rudder pedals will enable much more precise maneuvers during dogfights, compared to using the auto-coordination feature. This is no surprise. But if you have been a dedicated civilian sim enthusiast who only has been using a yoke-style flight control, like myself, you are going to run into immediate difficulty. That difficulty is that you are going to be shot down immediately and repeatedly, until you obtain a fighter style joystick. The yoke is simply too awkward to be competitive in this environment, requiring a long distance of travel for roll maneuvers. If you don't already have one, consider the cost of adding a joystick as part of the purchase price of CFS. You are going to need it.

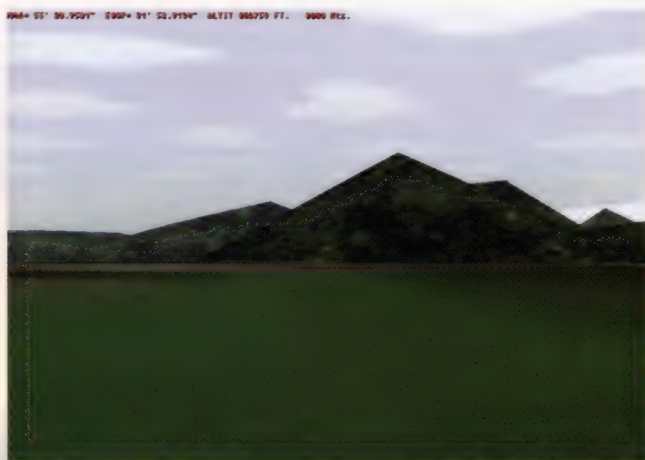
If you want to have both your yoke and your new joystick connected to your computer at all times, you can splurge with another \$25.00 (approx.) and buy the joystick switchbox from CH Products. This will allow both to be connected, without requiring manual switching, rewiring, etc. You can find a description of it in our Christmas buyers guide, *Santa's FBO*, in this issue.

The Scenery

The scenery engine for CFS is based on the same basic engine as FS 98, but with some very important improvements and additions:

Digital Elevated Mesh Terrain

No more "flat Earth technology," as in all previous versions of MSFS. This brings a whole new world of realism and scenery design possibilities to the table. As an example of this difference, I have chosen the runway start position of the CFS airport at Bern Flughafen in Switzerland. The pictures tell a thousand words.



FS 98 elevated terrain

A Look At Microsoft Combat Flight Simulator



CFS elevated terrain

Bitmaps are applied evenly over the elevated terrain to produce a very natural appearance.



City texture applied over elevation in CFS

Using Standard .BMP format and palettes

CFS can use any 8-bit/256-color bitmap and palette, rather than being limited to the RAW image format with one fixed color palette. This tremendously improves the rendering of ground textures. The following two screen shots show the difference.

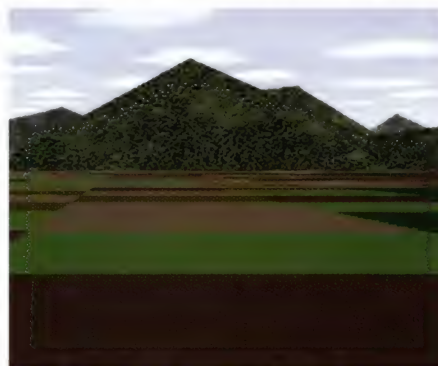


CFS texture rendering with variable color palette



Same texture rendered with the fixed FS5.pal of FS 98

The CFS design team took advantage of these improvements by applying much more detailed texture mapping, with an excellent artistic flair. With this eye for detail in mind, ground textures at and near airports, where flying at low altitudes is a given, the textures have been applied at about 5-8 meters/pixel (in my approximate estimate), compared to the usual 14-18 meters/pixel in FS 98.



Resolution in FS 98



Resolution in CFS

Rivers, roads and railroad tracks are now textured, as are large bodies of water. The color of the water is now very natural, in place of the old "postal blue" found in MSFS. Riverbanks and shorelines also have a more natural appearance.



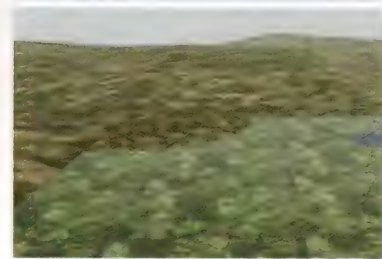
A Look At Microsoft Combat Flight Simulator



3-D objects and airport tarmacs are quite impressive. Since textured 3-D objects are my forté, I can say with authority that these objects are top notch. They have much better detail than the old “polygon and a runway” type of scenery found in previous versions of MSFS.



Haze effect in Combat Flight Simulator



Haze effect in FS98

The only drawback here is that the visibility distance can not be specified, as in FS 98. I think this is another negative that should be addressed in future versions.

By far my biggest and only real disappointments with CFS are the cloud texturing and the lack of advanced weather control, as you have in FS 98. The clouds remain flat and box-shaped, although the “wispy” translucent effect has been enhanced. What is really missing here is the option for an advanced weather dialog menu, as FS 98 has. Without this, it is not possible to specify multiple cloud/wind layers, visibility and cloud types. This is a feature that I would definitely recommend be included in future releases.



Haze effects in CFS are much more natural in areas of varying elevation. Also, the haze effect increases gradually toward the horizon. Compare this to the 3-D-haze effect in FS 98, which is really only effective over the lowest points of elevation, leaving higher elevation points almost uncovered. The sharp line of increased haze effect in FS 98 is also gone.



Cloud layer in CFS

A Look At Microsoft Combat Flight Simulator

The Sounds of Combat in Flight

The sound effects in CFS have been greatly enhanced. The sounds associated with weapons firing and the explosion of nearby aircraft and buildings is very convincing. There is also a very realistic sound associated with bullets and shrapnel hitting your own aircraft. All this adds to the realistic combat-in-flight environment.

Adding to these new additions for the combat aspects of the simulator, the familiar sounds we all associate with MSFS have also been dramatically improved. Starting the aircraft engines is no longer akin to turning on a light-switch and hearing the engine suddenly running. There is now a *start sequence* with a realistic rendition of the magnetos engaging and the exhaust and engine spooling up. It's very well done.

Aircraft Communications

The communications are very realistic and well thought out in terms of what you would expect during a combat mission. Of course, it is not "ATC chatter" type of radio traffic. All communications are oriented toward the mission and the requirement of flight. For example, if you forget to raise your gear, your wingman will tell you, rather rudely. Once combat commences, the calls, requests for help and other exhortative communications are very convincing and augment the total environment. Again, very well done.

The Aircraft

Microsoft made a very wise decision in making the CFS aircraft 100% compatible with those of FS 98. The file formats are identical in every way, so that you can actually place an FS 98 aircraft into the combat simulator Aircraft directory, without any converting, etc., and have a fully functional plane, with forward sight and machine guns, ready to do battle. There is also a converter program to transform FS 5 Flight Shop aircraft for use in CFS (FS 95 aircraft do not seem to convert).

The new aircraft that come with CFS all have excellent flight models and extraordinary detailing. These are top notch in every respect. Given that these new flight models are intended for aerial combat, FS 98 users may need to take a little time to get used to flight models which actually do snap-rolls, loops and other aerobatic maneuvers with such ease. You will also likely find the controls a bit more sensitive than you are used to, so it may be a good idea to reduce the various sensitivities a bit until you get used to it. This is done the same way as it is in FS 98.

Having said this, quite a bit of new technology is incorporated into the CFS flight modeling. The modeling was designed under the eye of Mr. Mike Schroeter. Mike is an aeronautical engineer and did stints as a flight instructor and corporate pilot. CFS flight models are based on a six-degree of freedom modeling, and the design group included details such as the change in aircraft weight and moments as the fuel and ammunition is expended.



Examples of the CFS aircraft

The new aircraft that come with CFS all have excellent flight models and extraordinary detailing. These are top notch in every respect. The aircraft include the North American P-51 (shown on the left); the Republic P-47D (lower left); Focke-Wolfe 190 (middle below); and the Messerschmitt ME-109 (lower right).



A Look At Microsoft Combat Flight Simulator

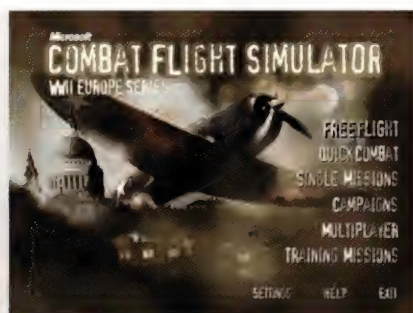
Another new aspect of the CFS aircraft is, of course, the damage modeling. The need for this in a combat simulator is evident. Mr. Bob Day, who previously worked on Microsoft's NT operating system, designed CFS's damage modeling. It works something like this: critical aircraft components are identified, for example a wing or an engine. Each component is "containerized" or surrounded by an invisible box. If a round of ammunition passes through the container, then damage is said to have occurred. CFS refers to a tabular "damage profile" to determine the extent of the damage to the component. By tabularizing this information, you can see that this is a very flexible modeling technique.

The nuts and bolts of just how this works and how this technology gets transferred over to aircraft that you add to your CFS library is something I have not yet discovered. But I am working on it, and you can bet a lot of other people who will probably be better at it than I will, too. So, I think it is safe to assume that in a relatively short time, we will see some exciting third-party additions for CFS. Additional types of armaments will certainly be another avenue that the third-party community will address quickly.

Ready for Combat!

CFS uses scripted missions, but they are not just simplistic "find the enemy and start shooting" sort of affairs that many of the combat games utilize. They have added quite a bit of realism, adventure, intrigue and unexpected events into them. Mr. Jon Seal spent more than a year collecting background information for CFS. For example, his research involved tracking down actual World War II mission charts, aircraft performance profiles and enemy logs, and conducting personal interviews with combat aviators. A look at CFS's Pilot's Manual will show you the extent of the research that went into this package.

When CFS boots up, you are presented with this menu:



You can choose free flight, where you simply choose your aircraft and which airfield you would like to take off from. You can fly at your leisure and enjoy the scenery. No enemy fighters will harass you.

Or, you can choose quick combat, which starts you out in the aircraft of your choice, in the air and immediately confronting enemy fighters. Training missions are also available, which can be very

useful to rookies, to get the hang of the simulator and the combat. On-line flying enthusiasts will enjoy the multi-player dimension, which is provided as well.

The single missions and the campaigns (which consist of an ordered sequence of single missions) are far more structured and take advantage of the aircraft communications radios as well.



The campaigns are even more structured, with pilot identification, logbook, ratings and statistics, based on your performance in combat.



For both single missions and campaigns, you begin on the runway, ready to take off, with your wingman right next to you.

A Look At Microsoft Combat Flight Simulator



His identity, along with the other members of your squadron, are given as ID labels, unless you turn this feature off under the **Views** menu. Once you take off, you can fly the mission in real-time, which means you fly the entire route (usually several hundred miles) and only occasionally enter combat. Or, you can press the **X** key and skip directly to the next action sequence. This gives you flexibility to fly the simulator however you want.

Although CFS ships with these scripted missions, CFS also incorporates the ability for the user to create his own missions. To make a new mission, you specify a geographical area, the number and type of enemy aircraft, etc. What's more, you can create "mini-sceneries," adding ground vehicles, barracks and fuel tanks, for example. These ground objects can be targets that sustain damage similar to CFS aircraft. The missions, objects and targets are specified within text files in the Missions subdirectory. Again, I have not quite figured the nuts and bolts of this, but it should be just a matter of time before the third-party folks jump into this arena.

Once the action starts, I can guarantee that you will not be bored. You will hear a radio message that enemy fighters are in your sector. The other members of your squadron will point them out, too. If you have the ID labels option on, they will be identified individually.



Pressing **W** provides a full external view, as in FS 98. In CFS, the vital aircraft information is displayed on the right-hand side of the screen, so that you can keep your orientation.



Full external view

As soon as you get to this point, it is a test of your skill vs. the enemy, a.k.a., the computer.



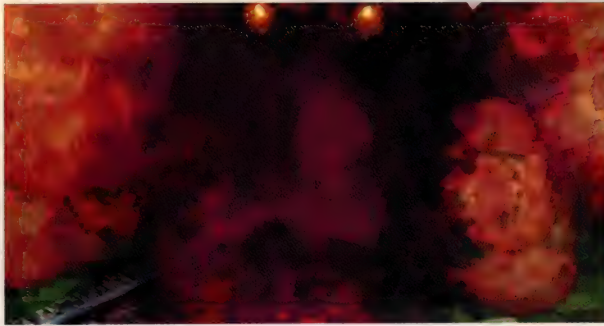
Targeting an ME 109, flying the P51 Mustang



Target destroyed!



A Look At Microsoft Combat Flight Simulator



*If they are not destroyed in the air,
the ground usually does the trick*

The damage to the enemy aircraft or to yours is not random. Everything is determined by the damage modeling and where the aircraft is struck.



*The extent of damage to an aircraft depends entirely on where it is
hit, and how many times*

Ground targets react in a similar manner.



After each mission, a complete debriefing is in order.

In CFS, the artificial intelligence module makes the computer a formidable opponent. I strongly suggest you do not underestimate it!



*The inevitable result of underestimating the program's artificial
intelligence*

Future Shock (or How to Destroy the Third Reich in Three Days or Less)

OK, I'll admit, this is sort of cheating. There are no limits to what kind of aircraft you can add to CFS, in terms of performance specs, engine type, etc. To illustrate this, I moved the excellent F-18 Hornet that Paul Hartle created for the *Flight Deck* software project, which I took part in. Paul's visual model was definitely up to CFS standards.



To my surprise, the performance of the aircraft and the function of the gauges were all up to specs. The autopilot also worked, even though it was not seemingly part of CFS.

Engaging the enemy with this advantage is a snap. Just make a high speed pass at the enemy aircraft, then loop and re-engage. At supersonic speed, they can't touch you, and you can pick them off one at a time. This is an interesting twist to the simulator's standard format.

A Look At Microsoft Combat Flight Simulator



Conclusion

Microsoft *Combat Flight Simulator* represents a new generation of flight simulation, with respect to both improvements in their present simulator technology and with the addition of top-of-the-line combat features. The flexibility of the combat aspects of CFS for expansion through third-party development, combined with the well-established MSFS simulator platform with all of its third-party aircraft, panels, gauges and other add-ons, make this software package a sure winner.

If you are a flight simulation enthusiast, a military/combat aviation enthusiast or both, you will be missing something if you do not procure *Combat Flight Simulator* for your hard drive ASAP. You just can't go wrong!

MEET THE CFS TEAM

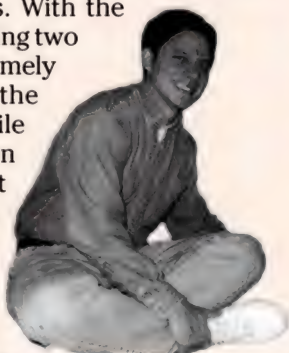
We talked to several key members of the CFS Development Team at a CFS press conference. Here's a quick introduction:

Ed Fries

Ed Fries is Microsoft's General Manager of the Entertainment Business Unit. Ed told us that Microsoft began creating CFS two years ago, based on feedback and focus groups conducted with flight sim users. But to pull it off, the games unit needed more help and was able to recruit staff and developers from other parts of the company.

Jose Pinero

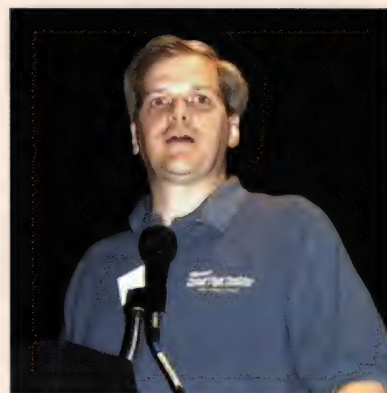
Product Manager Jose Pinero described Microsoft's "vision" for the flight simulation products. With the introduction of CFS, they are creating two distinct lines: the well-known, extremely successful Flight Simulator and the new Combat Flight Simulator. While the two lines will share common technology, Microsoft believes that the user requirements of these products are different. Like Flight Simulator, CFS is an open system, so it's possible for the user or third parties to add components that enhance and extend its capabilities.



Bruce Williams

Bruce Williams is the Product Planner for flight simulation. An appropriate description of his job is to be the "keeper of the feature list." Your FS wish list (and in the future CFS) is directed to Bruce's attention.

Bruce, who is also a Certified Flight Instructor, has been charged with determining what users are asking for, and he continues working hard to incorporate those requests into Microsoft's flight simulators.



Mike Schroeter

Mike Schroeter directed the design of the CFS flight modeling. Mike is an aeronautical engineer, and he did stints as a flight instructor and corporate pilot. The CFS flight models are based on six degrees of freedom. The design group included details such as the change in



A Look At Microsoft Combat Flight Simulator

aircraft weight and moments as fuel and ammunition is expended.

Bob Day

Bob Day, who previously worked on Microsoft's NT operating system, designed CFS's damage modeling. It works like this: critical aircraft components, for example, a wing or an engine are identified. Each component is "containerized" or surrounded by an invisible box. If a round



can sustain damage similar to CFS aircraft. Kris told us that the in-house mission editor is an Excel-like spreadsheet that contains the mission parameters.

Jon Seal

Jon Seal has spent over a year collecting background information for CFS. Some of his research involved tracking down World War II mission charts, aircraft performance profiles, enemy logs and



of ammunition passes through this container, then damage is said to have occurred to that component. CFS refers to a tabular "damage profile" to determine the extent of the damage to the component. By tabularizing this information, you can see that this is a very flexible modeling technique.

Kris Shankar

Kris Shankar is a man with a mission—actually many missions. A mission describes the preset scenarios that are part of CFS. The off-the-shelf package ships with many pre-built missions.



While this version of CFS does not include a mission editor, if it did, this is how it might work: specify a geographical area, the number and type of enemy aircraft, etc. Then build "mini-sceneries," adding ground vehicles, barracks and fuel tanks, for example. The ground objects might be targets that

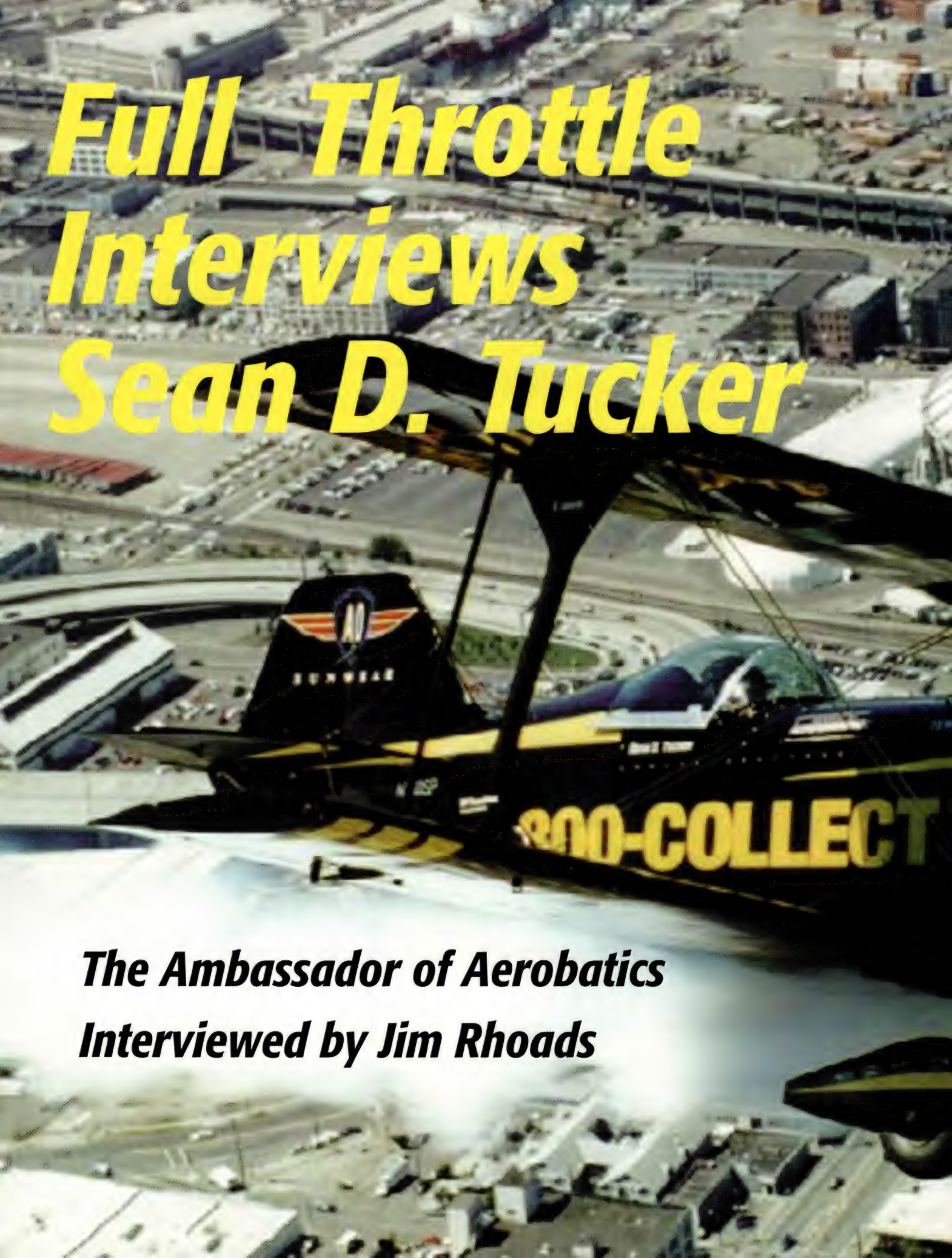
conducting personal interviews with combat aviators.

A look at CFS's Pilot's Manual shows you the extent of research that went into this package.

Jeremy Stone

Jeremy Stone implemented the artificial intelligence of CFS. The result is that you battle a very challenging enemy. The artificial intelligence of CFS adds a whole new dimension to what FS users currently refer to as "dynamic scenery."





Full Throttle Interviews Sean D. Tucker

***The Ambassador of Aerobatics
Interviewed by Jim Rhoads***



Sean D. Tucker, the Ambassador of Aerobatics: everyone who sees Sean Tucker perform walks away amazed and bewildered at how he makes his airplane do what it does. It is as if he has a license to break all the laws of physics or as if he controls them himself. I have watched Sean for many years and never thought that I would be able to talk to him, let alone interview him.

Sean B. Tucker's aerobatics began with sky diving at the age of 17. He accomplished seven successful jumps before tragedy marred his eighth jump, on which one of his good friends died. Totally shocked by this tragedy, Sean gave up skydiving. Although Sean knew he didn't want to be a skydiver, he also knew that somehow he needed to be in the air. Sean began to take flight lessons. The first few lessons he took were with a very reputable school. However reputable schools



Full Throttle Interviews

Sean said. "I can remember everything about it, from the sun speckling down to the dirt coming off the bottom of the plane. I knew this was righteous."

Enthralled by his new passion, Sean completed the 10-hour course in three days. Ever since then, he has been hooked on aerobatic flight. In the same manner that he completed his course, Sean did not waste time pursuing his new love. Sean attempted to be an air show performer in the 1970s. He went broke, crashed his airplane and learned that making a living as an airshow performer wasn't as easy as he wished it had been.

"So, I got a real job crop dusting, bought a house, got married and had babies, and once that was all done, I got into competition flying in the '80s, and became the national champion in 1988 in the advanced category. And from 1989 to the present, I have become a full-time airshow performer," Sean explains.

If you ever meet Sean Tucker, one of the first things you will notice is his genuine kindness. I expressed this to

Sean, and this is what he said: "I get what this is all about. I understand that people live their lives vicariously through us and that we inspire people. I have been given a blessing. The blessing of my health, the blessing of my passion, the blessing of my nerve, because it takes nerve to do this. In addition, the blessing of a sponsor. It takes all four of these elements to make this happen, and I realize that I could lose any one of them at any given time. No one has them forever, and because this is such a finite experience for me, I want to take time with all of those people who love and encourage me and what I do."

I asked Sean a few more questions about his life and his career, and here is what he had to say:

Full Throttle: Have you had any narrow escapes?

Sean: Oh yeah, but not lately. I never have really blown it in any air-shows, but in 1979, I almost died. The airplane failed to recover from a flat, inverted spin. I didn't get out until I was 700 ft. above the ground. It was total pilot error, due to my own ignorance and ego. I lost my dream. People were telling me that I was pushing the envelope too much. They were worried

cost significantly more than less-reputable schools and being low on money, Sean had to continue with the latter.

Sean quickly learned a hard lesson on Value vs. Quality. Although saving money, he received terrible instruction. "The instructors were really, really bad," says Sean. "They instilled a fear into me that I had a hard time shaking. I was afraid to stall an airplane, and in fact, I came in for a landing and kind of messed it up and the instructor took the microphone and smacked me on the hands with it and said 'You almost killed us!'"

Sean endured long enough to receive his license after around 55 hours of work, but even after receiving his certificate, he was afraid to stall the airplane. "I just knew that if I got that little 150 Cessna in a stall, it was going to spin out of control and smash into the ground," Sean said. "I just new I was going to die. So here I am, a licensed pilot, afraid to take the plane over a 45-degree bank and white knuckled all the time. I knew I had to do something to conquer this fear."

Shortly after that, Sean enrolled in an aerobatic class in San Jose in 1973. "The first time I rolled that airplane upside down..., I knew I wanted to be there,"



Sean D. Tucker

about me and I told them they were crazy and they didn't know what they were talking about. That was my own insecurity. I wasn't listening to the old guys. They have white hair for a reason; they have been around the patch awhile. I just thought they were all jealous. At that time, I lost my dream, and it was totally my fault. It took me until 1984 before I could afford to buy another airplane: a homebuilt. It had a great paint job on it, but it was a piece of junk. Consequently, it had a structural failure and I had to jump out of it as well.

Full Throttle: Speaking of older fellows, I can remember being at an air show and hearing a couple of older gentleman saying, "He's going to kill himself, just watch and see." Does that thought ever cross your mind?

Sean: Well, first of all that really hurts my feelings that they say that, but people do say that. I totally understand that everyday I walk in that airplane I could die. I know that you can die in a split second and that is where the nerve comes in. I walk up to that airplane knowing this is dangerous. This is not Basket Weaving 101; this is the real deal. Therefore, when people say that, it hurts, because I take such pride in my discipline in dealing on that level. I am so focused, and I have flown over a thousand air-show performances. The reason I feel like I am going to survive is [due to] my mental attitude, my discipline, my athletic ability and physical routines that I maintain to withstand 10 to 11 positive Gs and seven to eight negative Gs and maintaining the airplane to the same highest standards. This airplane is only two years old, and it is completely dismantled every year. The motor comes off, the fabric comes off, and it is completely overhauled. In fact, I have a contract with them, that if they maintain the plane to the highest standards, I have to maintain myself to the same standards. If they're doing their job, I have to do mine. I have more friends dead than I do alive in this business. 99% of the time [a fatality] is [due to] pilot error. They lose focus and discipline and they kill themselves. And it's hard sometimes. Maybe you have trouble at home or trouble at the airshow, etc., but you have to stay focused, put everything out of your mind and go to work for that one purpose: to share the magic of flight with the folks. You have to fly to the best of your abilities and for the right reasons.



Full Throttle: Sean, I guess it is fair to say that you have total trust and confidence in your crew and plane.

Sean: That's right. And I have trust in the path that I am walking. I know that I am supposed to be doing this, and I think I will know when I am not supposed to be doing this. And when that happens, I will hang up my helmet, push the plane in the hanger, and I will be done with it.

Full Throttle: *Full Throttle* magazine is a flight simulation and real-world aviation publication. I am sure some of our readers would like to know whether you have or still do use simulators, and what you feel are the benefits of using simulators?

Sean: Well, I am not really very computer literate, and I can barely answer my e-mail (chuckle). I am the worst instrument pilot in the world. I have 15,000 hours flying time, but my whole career has been either a crop duster or airshow pilot. I think that where flight simulation can be a big benefit to me is to help my skills with instrument flight. The reason I am so bad is that I don't do it. I don't fly when it's bad out. That is my weakness, and I believe flight simulation gives you better hand/



Full Throttle Interviews

that it was broke. If that happened in a monoplane, the wing would come off. Biplanes are good in that respect. There is redundancy.

Full Throttle: I took a ride in an F-16 this July, and we pulled anywhere from seven to nine Gs several times. Do you still get that beat up feeling after your performances?

Sean: Oh Yeah. Even though I stay conditioned to help me endure those kind of Gs, I still get beat up. I broke a vertebra in my neck this year and have had to wear a neck collar during my performances.

Full Throttle: Where did you come up with the name *Challenger*?

Sean: Well, life's a challenge and so is aerobatic flight.

Full Throttle: What advice would you give to a pilot interested in pursuing an aerobatic career?

Sean: Number one: There is a future out there, but it is not an easy future.

Moreover, I think they need to take care of their family first, do not lose your family over your dream, and make sure that you have everything in perspective. I think the ones that are going to be successful down the road are the ones with an incredible amount of passion and discipline, so that they don't kill themselves. I think it really helps if they become involved in the International Aerobatic Club, because that gives you a structure and forces you to have discipline because people are watching you, grading you. You will need to accept criticism to help become a better pilot. To listen to your peers when they are telling you that you are dangerous. Always ask for advice, and never weaken on your dream. The ones that succeed in this business are the ones that are strong willed and passionate.

Sean Tucker is more than just an aerobatic pilot. His abilities coupled with his unique personality and drive make him one of the best in the business. Sean never seems to be complacent with where he is. He always strives to be just a little bit better, just a little more unique. Sean D. Tucker is one name that will always be remembered in aviation. He is a living legend, if you will.

eye coordination, you visualize the whole world, and it will definitely make you a better pilot. I need to use simulators more and being a good instrument pilot is one of Sean D. Tucker's goals.

Full Throttle: You just brought up a good question. Sean "D." Tucker What's the "D" stand for?

Sean: Mr. Dorthy. Mr. Dorthy loaned my dad \$10,000 dollars to get through law school. So, guess who I was named after?

Full Throttle: That little black plane is so deceiving to stand beside. It's so small but so powerful. Why a biplane instead of a conventional, like an Extra or Sukhoi?

Sean: There is a romance with my plane. The biplane can turn the corners so tightly and keep it in a real tight spot, as opposed to the mono that have to turn the energy so far. Monos are really great for competition flying. It's elegant, has wonderful lines and angles. But a biplane is stubby, down and dirty. This one we built is the best and most powerful biplane in competition right now. A biplane is much more forgiving. I broke the upper rear spar on my previous show plane and didn't realize it. When we took the fabric off, we saw



Sean D. Tucker

Do yourself a favor and catch Sean D. next time he is at an airshow near you. I guarantee you will never forget it. In Sean's own words, "I do not want that crowd to be bored. And when I'm done flying, I know that crowd's looking up there and even if they have never been to an airshow before, they're going to say, 'That's what I thought an airshow should be like!'"

In addition, if you are ever in Salinas, California, stop in and visit his aerobatic school of flight. Or visit Sean's Web page at <http://www.poweraerobatics.com/>.

The Ambassador—it's a fitting title.

Sean's Crew

Tom Dygert, Crew Chief

Tom Dygert is the 1-800-COLLECT Crew Chief and co-owner of the 1-800 COLLECT Challenger II. Tom supervises the annual rebuild of the Challenger II and has personally designed and constructed many of the planes innovative systems and aerodynamic modifications, including the titanium pyrotechnic mounting racks and sophisticated electronic firing systems that are used in the *Stardance* night performance that Sean performs.

Tom has previously served as a crew chief over UH-1 Huey and AH1J cobra helicopters in the United States Marine Corps and is a veteran of the Vietnam war.

Brian Norris, Operations Coordinator

Brian Norris is the team Operations Coordinator. Norris holds pilot ratings for Instrument, Single-engine and Multi-engine. He is also a Certified Flight Instructor and recently earned a title as Aircraft Maintenance Technician. Norris's father flew A-4 Skyhawks and commanded an AV-8B Harrier Squadron.

Norris flies the support aircraft, which is also used as a camera platform for media photo flights.

He assists in the maintenance of the team's planes, announces some of Sean's performances and prepares the Challenger II with 150 pounds of fireworks for the evening shows that Sean performs. Norris is in his ninth season with Sean.

Sean's Aircraft: Challenger II

The 1-800-COLLECT Challenger II is a one of a kind 380+ horsepower biplane that was specially built for Sean D. Tucker. The Challenger II is the premier aerobatic biplane of its size in the world today. Because of the rigorous pounding Sean inflicts on the Challenger II, its engine is overhauled by Ly-Con of Visalia California, and the wings are completely rebuilt at the end of each season. Extremely thorough pre- and post-flight inspections are made every time the aircraft takes to the air.

Challenger II Facts:

Burns approximately 10 gallons of fuel and six gallons of smoke oil injected into the exhaust system per flight

Weighs in at 1,200 pounds

Powered by a custom modified Lycoming AEIO-540-D4B5 engine that turns a custom built, three-bladed composite propeller

Designed with a much more aerodynamic carbon fiber cowl, a more streamlined canopy and a much larger tail than the original Challenger

Approximately 30 mph faster than the original Challenger

Challenger II can unload for hard-charging, power aerobatics in less than 30 minutes

Clyde Green, Support Pilot

Clyde Green is the newest member of the team. He is a licensed pilot and an Aircraft Maintenance Technician. Clyde is responsible for ferrying the Challenger II from show to show, as well as helping maintain the team's four aircraft.

Green's background includes being the Director of Maintenance of an air charter company. He is also a former Director of Maintenance for National Airshows, where he was responsible for maintaining 13 aircraft, including four Pitts Specials, an F-86 Sabre and a Chinese built MiG-15. He also has time in Piper Navajos and has accumulated over 2,500 hours flying time.

Eric Tucker, Sean's Main Man

Eric Tucker is the announcer for the 1-800-Collect Power Aerobatic Team. Eric is 16 years old and shares his father's passion of aerobatic flight. Eric soloed gliders at 14 and powered aircraft at 16. His first powered solo was in Sean's Pitts S-2B. Eric just obtained his Private Pilot Certificate for powered and glider aircraft, he is studying and listening closely to the advice of his father on aerobatic flight.

Dynamix, part of Sierra's family of brands, has recently announced *Flight Simulator*, the second title in the company's general aviation line. Rhoads takes a close look at this new program that promises enhancements and a significant new set of features.

A Look At Pro

Pro Pilot 99 is poised to be the only general aviation simulator ready to launch for the 1998 fall/Christmas season. Although Pro Pilot 98 endured several patches and many struggles, Pro Pilot 99 (PP 99) is a much more stable program with many enhancements over Pro Pilot 98.

I have been able to spend some time with PP 99 so I can offer these observations on what has been improved over PP 98 and what still needs more attention.

On-Line and Written Documentation

Pilot Operating Handbooks (POHs) are new for Pro Pilot 99. Each Aircraft has its own specific Operating Handbook with specifications modeled after the real POHs of each plane.



Each POH is set up similar to a notepad with four separate tabs: Checklist, Performance, Flights and Notes.

The Checklist provides all the information applicable to the aircraft, from starting the engine to shutdown. The Performance tab lists all the performance, speed, weights, limitations, etc. for the aircraft.

The Flights tab offers tutorials, like how to enter and fly the pattern, and how to select, track and tune a VOR.

Also new is First-flight assistance. Now you can access portions of the flight assistance CD from within the POH. First-flight assistance provides audio information to guide you through the use of the cockpit panel gauges, knobs, switches and radios.

The Notes tab allows you to save your own notes for each aircraft. This file has to be opened from Explorer in notepad (or an equivalent text editor) and be written to and saved before it will reflect the additions that you make.

According to Dynamix (pronounced as Dynamics), this Operating Handbook system was written with the help of NAFI (National Association of Flight Instructors) for clarity and accuracy.

Help menus are now available online and in a printed handbook, too. I find a written handbook very helpful when I have several things



ced Pro Pilot '99, The Complete
on simulation product line. Jim
-D graphic acceleration, visual

Pilot 99

running on my computer. This is a nice addition and one that was addressed as a result of user

complaints about not having a printed handbook in addition to the online version in PP 98.

The online help menu seems to be much more organized, with a cleaner interface than before. PP 99 also retains the flight companion handbook that was released with Pro Pilot 98. As I have stated before, this is an excellent reference book for beginners and advanced aviators, packed full of useful knowledge to assist you in almost all realms of flight.

This book alone is worth a fair amount of the purchase price. You can learn everything, from the four fundamentals of flight to the complex systems of the Beechcraft Super King Air 200 or the Cessna Citation business Jet. This is truly an excellent reference manual.

Aircraft

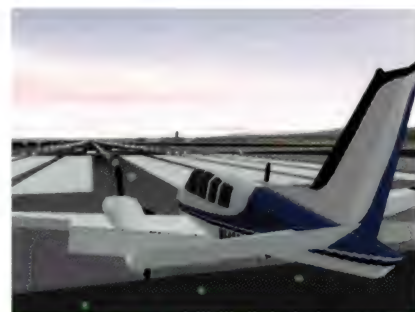
Pro Pilot 99 retains the same aircraft as its predecessor:

- ✈ Cessna C172P
- ✈ Cessna C172R
- ✈ Beechcraft Bonanza V35
- ✈ Beechcraft Baron B58
- ✈ Beechcraft Super King Air 200
- ✈ Cessna CitationJet

Review by
Jim Rhoads

The Pro Pilot team has spent a great deal of time tweaking and improving the modeling of the aircraft. One of my more critical areas in judging a flight simulator is the flight dynamics. It is obvious to me that the team has worked very hard on these models. All basic flight characteristics seem better than in PP 98. Although not perfect, these aircraft exhibit overall decent behavior. All aspects of the flight models have been addressed, including stalls and ground effects, which were among the most problematic.

Movable control surfaces are also new to PP 99. Flaps, rudders, ailerons, etc., now move and can be seen in external view. If you're a fan of flying from the external viewpoint, this enhancement will please you. I must admit that typically I am a cockpit-mode flyer. However, occasionally I operate from external view to see what I am flying and how it looks. The movable control surfaces add a nice touch to the realism of the experience.



A Look At Pro Pilot 99

Scenery

More Taxiways! ProPilot 98 suffered from the lack of taxiways. PP 99 has implemented many taxiways at all major airports and many at smaller ones. This is a sorely needed element; it is hard to taxi if you don't have a taxiway.



Dynamix also announced that they would release the portion of code that would allow users to create their own taxiway lighting. Although, this requires a bit of programming knowledge, and the user will have to sign a non-disclosure agreement with Dynamix.

PP 99 has flight areas in both the United States and Europe. Unfortunately, no trans-Atlantic flights are available. These are two separate scenery areas and there is no aircraft available in PP 99 to make the skip over the pond.

PP 99 uses a new method to define city and urban lighting. City lights are not rendered as before, from lighted pixel points in the textures. PP 99 uses lighted polygons that fade in and out according to the location of the aircraft in relationship to them, thus reducing the common problem of those little pixels flashing rapidly and driving you buggy during night flights. Although this is a different method of lighting than what I am used to, it seems to grow on me and definitely is a benefit when flying Visual Flight Rules (VFR) in assisting to locate and establish reference points.



Panels

Panels are now scrollable. PP 99 also has a new "hot key" (F7) to switch from full view to panel view. This reduces the tedious work that was involved in PP 98 of switching through several views to get back to panel view. This is a nice feature when on approach or final. Key mapping is also available if you want to change key functions.



Views

Gone is the need to setup view distances from the "setup cam" menu. PP 99 uses a free floating system, so that now you can use your joystick or hat to move or "slew" around from different view points. When viewing the aircraft from an external view, engine sounds fade in and out as you slew toward and away from the aircraft, giving a measure of realism to the viewing system. The provided documentation helps the user become familiar with the new viewing system.

PP 99 now has separate taxi and landing lights specific for each aircraft. These are only available in 3-D mode, unfortunately, but they work well at illuminating the runway on approach and final.

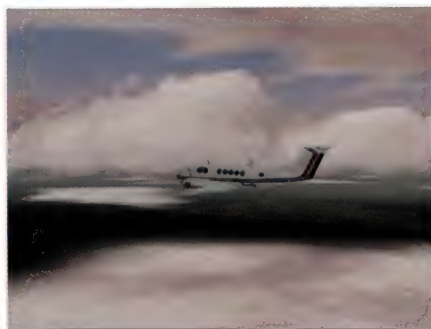
3-D Rendering

Sorely needed in the earlier version, PP 99 now comes with 3-D rendering achieved through 3Dfx Glide compatible graphic cards. This allows sunglare, bilinear filtering (image smoothing), Alpha blending (transparency), mip mapping, adjustable visibility and haze, faster frame rates (by reducing the load on the processor), and translucent clouds. This addition clearly helps PP 99 in many ways. From increased frame rates, to helping reduce the pixilated appearance from low-level viewing. Ground textures now appear smoothed from all elevations.

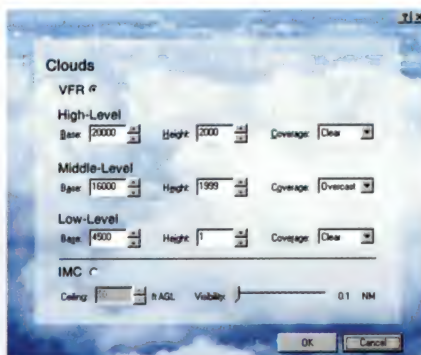


Clouds and Weather

In my opinion, PP 99's cloud system is unmatched. As a real pilot, I have to fly through clouds and changing weather systems as I travel. PP 99's clouds have the most realistic cloud rendering I have seen. The experience of transitioning through PP 99's clouds is most convincing. I have to give PP 99 two thumbs up for implementing this feature.



Also new in the Cloud section is IMC (Instrument Meteorological Conditions). This option creates a uniform bank of fog that limits the visibility to the range specified, from .01 to 20 miles. This is a great feature for practicing instrument work. The Weather | Clouds section has High-level, Middle-level and Low-level clouds with the ability to change the height and coverage for each layer.



The surface conditions option now works correctly. This option defines the temperature, atmospheric pressure, surface wind direction, speed and character (steady or gusting).

Sun glare is added to PP 99 as well. At certain angles, you can see circular glares that are supposedly caused by the sun. I have never seen this when I fly in real life, but nevertheless it's a pleasing feature and adds another element to the 3-D experience.



Air Traffic Control (ATC) and Autopilot Problems Addressed

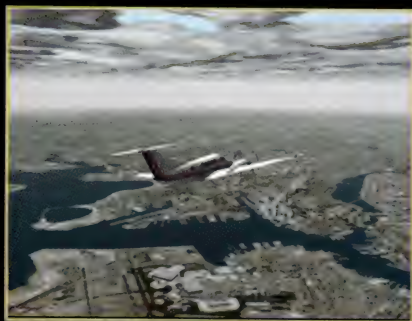
Pro Pilot 98 suffered from some problems with both ATC and the autopilot. Over vectoring problems and extreme altitude changes have been addressed with the ATC module. Dynamix stated that both the ATC and the autopilot are now stable. No more wild oscillations, the heading bug is fixed, straight tracking is now possible, and the altitude hold now works correctly.

Other Enhancements

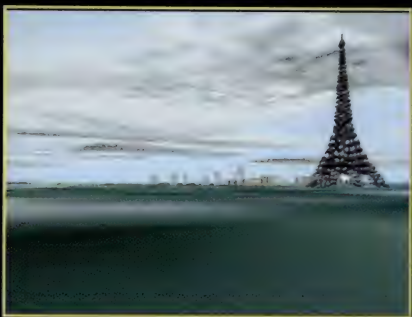
The PP 99 flight planner now incorporates automatic route generation. It will now automatically set up waypoints, vector you around mountains and obstacles and select all waypoints in between your departure and your destination.

The date and time module now performs more accurately than the previous version. So now, when you pick from Eastern, Central, Mountain or Pacific Time, it should be more accurately depicted. You can still choose UTC time, manual

A Look At Pro Pilot 99



Examples of the aircraft, scenery and more from Pro Pilot 99



local time, or automatic local time for the date/time, or you may set it to your system time.

Gauge fidelity is now enhanced. PP 99 features reworked panel gauges to provide movements that are more accurate. Needles move much more accurately and all gauges move in smaller increments. The result is less jerkiness and more realistic instrument feedback, which is an absolute must when practicing instrument flight.

Now that you have had all the good news...

To present a fair viewpoint, these are things that I feel Pro Pilot is lacking.

No third-party support. Despite the claims of being "The Complete Flight Simulator," it is not there yet. And even if it was, I believe most people want to manipulate, customize and create with this package as well as any other general aviation flight simulator. Although PP 99 incorporates many excellent features, such as GPS, flight planning and improved ATC environment, I think many users would like to be able to choose their available options and not have a totally "canned" program. Scenery, aircraft and panel design has become a very popular "hobby" within a hobby" inside the flight simming community. It still remains a glaring omission in the Pro Pilot package.

More planes. This goes along with third-party support, but it would still be nice if PP 99 included a few more planes or maybe a "heavy" passenger jet. It seems kind of a waste to have scenery areas in both the United States and Europe, with no means of getting from one to the other.

More accurate flight modeling. Aircraft tend to bleed their speed too quickly, and turn radiuses do



A Look At Pro Pilot 99

not seem tight enough. But overall, these aircraft are improved and exhibit decent behavior. PP 99's flight models are much more improved over PP 98's. In addition, from conversations with members of the team, I know that they are striving for better modeling

Wider support for 3-D video cards. PP 99 only supports 3Dfx Glide cards. I hope that the next version will have support for DirectX 3D, Open GL and windowed 3-D. I would love to be able to run Pro Pilot in a higher resolution than 640 x 480. Additionally, when considering the present market in flight simulation and the number of DirectX users particularly, present simmers that want to look at this product may not be able to access the 3-D rendering without purchasing new hardware. This is not likely to sit well with many of PP 99's potential customers.

Conclusion

All in all, PP 99 appears to be a much more stable, friendlier package. Again, one has to remember that this simulator is only two years old. Pro Pilot 98 got off to a rocky start when many of the scheduled release dates kept changing and many other problems plagued PP 98 after its release.

To help relieve these problems, Dynamix released three patches to customers at no cost in an effort to improve the earlier version and show ongoing customer support. Things seem to be a bit more focused for Pro Pilot 99.

PP 99 should hit the shelves in late October. More features have been added and the program seems very solid. Previous customers can upgrade to PP 99 for \$29.99 (20 bucks off) until December 31, 1998. The retail package price is \$49.99.

It can be argued that this is what Pro Pilot 98 should have been. And, maybe this is rightly so. I would

doubt that even Dynamix would argue the point. But for less than the cost of a dinner and a movie to upgrade, Pro Pilot still has some of the best panels, sounds and internal features available in a general aviation simulator.



Pro Pilot 99

Minimum Configuration

- IBM PC Compatibles
- Pentium 133 MHz, 4x CD-ROM, 100 MB hard drive space
- WIN 95 or WIN98
- 32 MB RAM
- SVGA, 640 x 480 @256 colors
- WIN 95-compatible sound card
- Mouse

Recommended Configuration

- IBM PC Compatibles
- Pentium II 200 MHz, 8x CD-ROM, 550 MB hard drive space
- WIN 95 or WIN 98
- 64 MB RAM
- SVGA, 640 x 480 @256 colors, 3Dfx graphics card
- WIN 95-compatible sound card
- Rudder pedals and Yoke or Joystick

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Round Robin

By Al Pelletier

Adventure #4

This issue's installment begins at Exuma Int'l Airport on Great Exuma Island in the sunny Bahamas. Our first stop is at Guantanamo Bay, where we receive a radio call asking us to pick up a pump (located in Great Inagua) for a disabled freighter. Plus we also have to pick up a sick person at the abandoned Mayaguana airfield.

This Round Robin was flown with Microsoft FS 98. However, it can be flown with any flight simulator that has the required airports and nav aids.

Aaah, the sunny, sandy Caribbean. I have departed from the usual format in this Round Robin mission. This one should be a lot of fun—we'll find a disabled ship and simulate an equipment drop, then perform a medical evacuation. This flight is over water with minimum use of nav aids, as they are few and far apart in the Caribbean. Download your favorite DC3 or twin turbo from a flight-sim Web site and have some fun.

We will begin at Exuma Int'l Airport on Great Exuma Island in the sunny Bahamas. After the first stop in our Round Robin, Guantanamo Bay, we receive a radio call asking us to pick up a pump (located in Great Inagua) for a disabled freighter. And to make it even more interesting, we also have to pick up a sick person at the abandoned Mayaguana airfield. The freighter is located 20nm away in

Route Round Robin #4

Exuma International Airport (Exuma Islands, Bahamas) to Guantanamo Bay NS (Cuba) to Great Inagua Island (Bahamas) to Mayaguana (Bahamas) to Exuma International Airport (approximate distance: 602nm)

Exuma Sound, just west of Stella Maris (actual lat. and long.: N23° 41.1', W75° 31.6').

The Round Robins use real-world navigation

This RR was flown using Microsoft FS98 default scenery. It can also be flown with any simulators that have the required nav aids and airports.



This is the route of Round Robin #4

If you flew previous RRs, skip the next paragraph, jump right in, and have fun. For those who are new to this, Round Robins are published so flight simmers can fly, look at the scenery, refresh geography

A Caribbean Round Robin Adventure

CoPilot - [Flight Plan3]

File Edit View Navigation Window Help

Waypoint	ID	Elev	Position	To Next Waypoint	Course	Distance	Comments
Exuma Intl	MYEF	7	N 23° 33.7'	126T	0.7 nm	VOR ZEF 112.20	
	Freq		W 75° 52.5'	132K			
GREAT EXUMA I.	ZEF	26	N 23° 33.3'	170T	222.1 nm		
VOR	112.20		W 75° 51.9'	176K	0.7 nm		
NAVY GUANTANAMO BAY	NBW	89	N 19° 54.3'	054T	47.0 nm		
VOR	114.60		W 75° 11.9'	059K	222.8 nm		
BARACOA	UBA	89	N 20° 22.1'	053T	59.4 nm		
NDB	278		W 74° 31.6'	059K	269.8 nm		
GREAT INAGUA	ZIN		N 20° 57.6'	025T	1.5 nm		
NDB	376		W 73° 40.7'	032K	329.2 nm		
Great Inagua	MYIG	7	N 20° 59.0'	023T	91.1 nm	NDB ZIN 376	
			W 73° 40.0'	029K	330.7 nm		
Mayaguana	MYRN	10	N 22° 23.0'	290T	65.7 nm		
			W 73° 02.0'	297K	421.8 nm		
Colonel Hill	MYCI	3	N 22° 45.0'	309T	79.1 nm		
			W 74° 09.0'	316K	487.5 nm		
STELLA MARIS	ZLS	26	N 23° 34.8'	293T	15.8 nm		
NDB	526		W 75° 15.8'	300K	566.6 nm		
			N 23° 41.1'	247T	20.1 nm		
			W 75° 31.6'	253K	582.4 nm		
GREAT EXUMA I.	ZEF	26	N 23° 33.3'				
VOR	112.20		W 75° 51.9'		602.5 nm		

This is the CoPilot display of the flight plan.

knowledge, practice cross country navigation, perform approaches at different airports all over the world, and have FUN.

You will receive information like: airport departure and runway number, VORs and ADFs enroute, two or three middle airport destinations for VFR or INST approach, and then return to your point of departure. You will also be given ILS and LOM frequencies, minimums, procedures, etc. We'll tell you about the scenery needed to complete the flight and where to get it, as well as a little background on the geography of the area. After you fly a few of these, you will have a much better command and understanding of the different types of published procedures. You will learn to handle a lot of information in a very short time, while still maintaining control of your aircraft.

I also suggest that you read the entire route a couple times before starting out, so that you'll have the flight plan clear in your mind.

Scenery Required

The Microsoft FS 98 default is the only scenery required. If you have your booster files installed on your hard drive, you need to be sure that the Central America booster files (FS

98\Scenery\Camerica) are active.

Otherwise, be sure that your FS 98 CD-ROM is in your CD-ROM drive.

Geography

The Bahamas comprise an archipelago of about 700 islands and islets and nearly 2,400 cays and rocks, extending about 1,200 km (about 750 mi.) from a point southeast of Palm Beach, Florida, to a point off the eastern tip of Cuba. Only about 40 of the islands are inhabited.

Possessing a pleasant subtropical climate and splendid beaches, the Bahamas are one of the most popular year-round resorts in the Western Hemisphere, visited annually by 3 million tourists. The first tourist arrived in 1492, when Christopher Columbus made his first landing in the New World in the Bahamas. He named the island San Salvador, although he probably landed at Samana Cay.

For the experienced flyers, please be patient through all of the explanations, directions and extras. I direct this at newcomers to the flying world, so I must stick to plain language.

Have Fun!

First Leg

From: Exuma International Airport (MYEF)

To: Guantanamo Bay NS (MUGM)

Distance: 223nm



This is the Low Altitude Chart of Cuba/Guantanamo Bay.

- ➔ In Flight Simulator, click **World | Time & Season...** and set the time to 0700. In the **World | Weather...** dialog box, select CAVU (Ceiling and Visibility Unlimited).
- ➔ In the **World | Go to | Airport...** dialog, type "Exuma" in the text field and click **OK**.
- ➔ Dial in the GREAT EXUMA (ZEF) VOR 112.2 on NAV1 and set your OBI to 176°.
- ➔ Takeoff from RWY 12. After passing over the VOR (0.7 nm from the RWY) make a right climbing turn to 5,000' on Heading (HDG) 176°. Fly the 176° radial all the way down to Guantanamo Bay NS Leeward Point Field (MUGM).

NOTE: As you make the turn to the 176° radial soon after takeoff, beware of the radar balloon tether cable to your left. The balloon itself is at 14,000'.

- ➔ About 34 nm out of ZEF, you will cross the trailing line of reefs and small cays (islands) that mark the 100-fathom line between the Great Bahamas Bank and deep water.

A Caribbean Round Robin Adventure



Approach to Guantanamo Bay NS.

- ➔ Set the clock to 1100 hours.
- ➔ Dial in the BARACOA (UBA) NDB 278.
- ➔ Taxi to RWY 10 and take off, using a left climbing turn over the bay to 6,000', HDG 059°, and track the UBA NDB until directly on top, approx. 48 nm.

NOTE: Use the maximum rate of climb to 6,000', in order to clear the peaks that reach 4,000'.

- ➔ Over UBA, dial in and home the GREAT INAGUA (ZIN) NDB 376.



Map and route of Guantanamo Bay to Great Inagua.

NOTE: The ZIN NDB is offset several miles to the right of the airfield.

- ➔ Once you see land, descend to 2,500 ft in preparation for a visual approach to RWY 06 (actual course 060°, elevation 7', and RWY length 7,000').
- ➔ Once over the NDB, turn left HDG 360° and over-fly the airport to establish a downwind approach to RWY 06.
- ➔ Check that your gear is down and land RWY 6.

NOTE: Keep your engines running as the oil pump for the stricken freighter is quickly loaded aboard.

Third Leg

From: Great Inagua (MYIG)

To: Mayaguana (MYMM)

Distance: 91nm

- ➔ Set the clock to 1300 hours.
- ➔ Turn the aircraft around and takeoff from RWY 24, with a left climbing turn to 4,000', then turn back and over-fly the airfield and set course to 029° magnetic for 92 nm.

NOTE: If you are a seasoned airman, you can input some wind and fly a track to Mayaguana!

- ➔ Once you see the island, begin descent to 1,800' and proceed with visual approach to the airfield.
- ➔ Be sure the gear is down and land RWY 6 (actual course 060°, elevation 10').

NOTE: Pick up the Med-Evac, turn around and get out of there.

NOTE: In actual life, this airport has been abandoned but is still flown into from time to time.

Fourth Leg

From: Mayaguana (MYMM)

To: Exuma Int'l (MYEF)

Distance: 181nm

- ➔ Set the clock to 1500 hours.
- ➔ Dial in the GREAT EXUMA (ZEF) VOR 112.2 on NAV1 and the STELLA MARIS (ZLS) NDB 526.

- ➔ When you lose the ZEF VOR, dial in the GUANTANAMO BAY (NBW) VOR 114.6 on NAV1.
- ➔ A little while after losing ZEF, look for Duncan Town Field in the Jumentos Cays, off to your right.
- ➔ About 75 nm north of NBW, its VOR 114.6 will kick in.
- ➔ 13 nm out from NBW, begin your descent to 2,200' in preparation for the approach pattern.
- ➔ Over-fly the airfield and VOR at 2,200', then make a left turn to HDG 100° to establish the downwind leg and continue descent to 1,200'.
- ➔ 3 nm out make another left turn to 280° and proceed on a visual approach into Leeward Point Field.
- ➔ 2 nm back you are cleared for a full stop to RWY 28 (actual course 280°, elevation 56', RWY length 8,000'). Be sure your gear is down.
- ➔ Land Guantanamo Bay NS

Second Leg

From: Guantanamo Bay NS (MUGM)

To: Great Inagua (MYIG)

Distance: 108nm

A Caribbean Round Robin Adventure

- ✈ Turn the aircraft around and takeoff from RWY 24, making a right climbing turn to 5,000' on HDG 297°.
- ✈ Watch for some low islands to your right just before Acklins Island appears ahead with Crooked Island beyond.
- ✈ After approx. 66 nm, on top of Colonel Hill Airfield on Crooked Island, make a right turn to HDG 316° and track ZLS to Stella Maris. ZEF will kick in very soon.
- ✈ Deadman's Cay will pass to your left. At 45 nm from ZEF, descend to 2,200' in preparation for the low-level approach to the freighter and the airdrop of the replacement oil pump.
- ✈ On top of ZLS, make a left turn to HDG 300° and descend to 1,000'. You will be approaching the freighter from astern and should acquire it visually about 5 nm after your turn.
- ✈ Fly down the freighter's heading (approx. 270° magnetic) and carry out a 90/270. A "ninety-two-seventy" is known in maritime flying as a way of coming back over a target on a reverse course. You simply fly down the ship's course for about 30 seconds, then turn right 90° for 30 seconds and then left 270° and you should have the ship ahead of you and on reverse course.
- ✈ After making the drop, increase power and make a left climbing turn to 2,500' on HDG 253°, and track the ZEF VOR until you see Exuma International Airport.
- ✈ Once you see the airport, proceed with approach to RWY 30.
- ✈ 2 nm back you are cleared for a full stop to RWY 30 (actual course 300°, elevation 7', and RWY length 7,000'). Lower your landing gear.
- ✈ Land Exuma International.



Many thanks to Eric Randle of Comox, BC, who helped in writing this adventure. Eric is one of the keepers of the WINGS.ARK.COM site.

Visit Al Pelletier and his crew at:

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WELCOME HOME!



Virtual Flight Training: VOR Navigation

By David Lewis

In previous issues, we have reviewed finding your way by landmarks, by dead reckoning and by Non-Directional Beacon (NDB) nav aids. This time we'll look at the device that has almost completely replaced the NDB in the more populated parts of the world: the VOR.

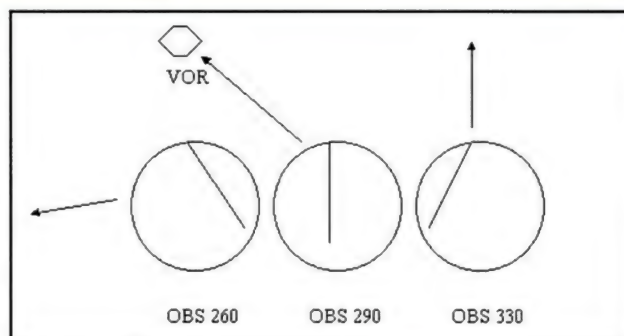
VOR stands for VHF (Very High Frequency) Omni-directional Radio-range. The key part of that name is "directional." The VOR sends out a slightly different signal to each point of the compass (by applying a phase shift), so the receiver can know accurately what the bearing is to the VOR. To get the same result with an NDB requires a rotating antenna on the aircraft. As the antenna rotates, the signal is strongest when the antenna is lined up with the beacon, thus giving you the bearing.

The VOR system of transmitting a signal is different from the NDB's. This increases accuracy and removes problems of signals being reflected off buildings or mountains. But it does so at the cost of reduced range. Where range is important and it is not possible to install additional beacons (for example, on island chains), the NDB remains the chief radio aid. But a bigger difference of the VOR is how the data is presented to the pilot.

Start FS 98, and position yourself at Concord California's Buchanan Field. On the radio stack, set NAV1 to 112.10 (the frequency for Scaggs Island VOR). Look at the receiver on your instrument panel. In FS98 it should be telling you that it receives nothing—you may see a red/white striped warning indicator or the word "Off." That's because a VOR only works on line-of-sight, and too many buildings in the way at ground level. (In FS5 this real-world problem was ignored, and you would receive a signal.)

Now select Slew mode (press the **Y** key) and then click **World | Go to | Exact location** to set your altitude to 5,000 ft. Look again at the instrument, and the vertical needle should have moved. This shows you are getting a signal. Now press **V** then **1** to select the Omni-Bearing Selector (OBS) for NAV1. Press and hold the **+** key and watch the selected bearing change. The needle also swings. When the needle is straight up, in the middle of the dial, release the **+** key. You have just found a bearing between yourself and Scaggs Island VOR. It will be about 290 or 110.

This column looks at the development of navigation and flight planning, from the earliest days of biplanes with road maps in the cockpit to the latest jet airways. Along the way I'll detour into various aspects of aviation, including charts, weather and controlled airspace, with exercises for you to practice on your simulator. By the end of the journey you should be able to find your way safely from A to B in the simulated world using Microsoft Flight Simulator (MSFS), or any other comparable flight simulator. For these demonstrations, we will use Microsoft Flight Simulator 98 (FS 98).



VOR I instrument not on the bearing



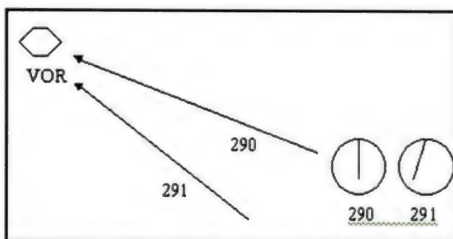
VOR I instrument on correct bearing

The needle is called the "Course Deviation Indicator" (CDI). It is centered when the bearing from the VOR to the aircraft matches the heading selected on the OBS. It also centers when these are 180

Virtual Flight Training: VOR Navigation

degrees different! To tell you which you are looking at, there should be an indicator, usually the words "TO"/"FROM," or in the case of our example, a triangle pointing up or down. If the word is "TO" or the triangle points up, then the bearing on the OBS is from the aircraft to the VOR. Select a bearing of 290, which is the bearing to Scaggs Island.

Now tap the **+** key once to increase the OBS bearing. See how the needle moves to the left. If you wanted to fly a heading of 291 degrees to Scaggs Island, you'd have to turn left first to line up.



See the row of dots across the middle of the CDI dial? Each dot represents two degrees off course. You can check this by tapping the **+** key again. Every two degrees you adjust the OBS, the needle should move one dot left. You can bring it back by tapping the **-** key.

So now that you can select a VOR and find your bearing to it, let's start flying toward Scaggs Island. Reset the CDI to the center, then press the **V** key to exit slew mode. Your aircraft's nose will drop immediately as it stalls from its stationary start at 5000', but it should soon recover. Turn onto a heading of 290 degrees, and

watch the CDI needle. If the needle moves to the left, turn left. If the needle moves to the right, turn right. When the needle is centred, make sure your heading is 290°. This way you should be able to fly directly to Scaggs Island.

Just like the Automatic Direction Finder (ADF), the CDI helps you correct for wind drift. If the wind blows you off course to the left, the needle automatically swings round to the right, and you correct. Use the same technique as for the ADF to avoid over-correction or homing. Flying away from a VOR using the CDI is easier than using the ADF. You just continue to follow the same rule: if the needle swings right, you turn right. What could be easier?

Another useful device, often located at the same place as a VOR, is Distance Measuring Equipment (DME). This radio navigation aid does exactly what it says, and tells you the distance to the beacon. On the Cessna 182 RG panel illustrated here, it's located just below the clock, in the upper-left area. The DME instrument can be switched to show the distance to the VOR selected on either NAV1 or NAV2.



The DME instrument



Cessna 182 RG Instrument Panel

Flight No. 6: Concord Buchanan Field to Santa Rosa, Sonoma County

Start the simulator and select Buchanan Field at Concord in the San Francisco area. You'll be positioned on runway 1. Select the Cessna 182 RG and choose any weather conditions you like.

Before take-off, tune in the Scaggs Island VOR on NAV1. The frequency is 112.10, and you can also set the OBS to 290. Take off and turn onto heading 290 and follow the CDI to the VOR. Aim to climb out to about 4,000' by the time you reach Scaggs Island.

Text concludes on page 48

Images below: (Left) Select Buchanan Field at Concord in the San Francisco area on runway 1. (Right) Scaggs Island in sight.



The Importance Of The Altimeter Setting

How important is an altimeter for instrument flying? It's essential, of course, to avoid flying into ground that you can't see. So the next question is, how to make it accurate?

The altimeter is basically just a barometer. It measures air pressure. The higher you fly, the thinner the air, and the altimeter shows the reducing air pressure as increasing altitude. That's fine, but what happens when the weather changes? On those miserable days when a trough of low pressure is on top of you and a constant drizzle soaks all your clothes, your altimeter recognises the low air pressure as increased altitude. You may be sitting in a parked aircraft, but the altimeter thinks you are soaring several feet off the ground. On cloudless, high-pressure days the opposite happens, and the altimeter will report that you are several feet below ground level.

To get around this problem, altimeters are adjustable, and show the air pressure setting in a sub-scale window. If you alter the pressure setting, the altimeter shows the aircraft going up and down. Provided the correct pressure is set, the altimeter will be accurate.

As part of any weather briefing, you should be told the air pressure at the airfield. When this pressure is set on the sub-scale, the altimeter should show the published altitude of the airfield above sea level (plus or minus the height of the aircraft, and any slope up or down to the parking area). This setting is also known as "QNH." With QNH on the sub-scale, your altimeter will always show the aircraft's altitude above sea level.

The "Q-codes" are a series of abbreviated names for commonly needed pieces of information, and presumably originate from the days of Morse code communication. Other examples are QDM, the magnetic bearing from the aircraft to a position, and QDR, the reciprocal of that heading.

In the UK, especially for local flights and training circuits, it is quite common practice to use a different air pressure setting known as QFE. This setting makes the altimeter read zero when the aircraft is on the ground at the airfield. If you are departing from an airfield, you can set QFE for yourself without needing a weather report: simply adjust the subscale until the altimeter reads zero. With QFE set, the altimeter will always show the height of the aircraft above ground level at the airfield.

Setting QFE removes the need to remember the airfield altitude while flying circuits or approaching to land. If the circuit height is 800', simply set QFE and fly at 800' by the altimeter. On the approach, the altimeter shows the height above ground, reducing to zero on touchdown. There is no need to remember and subtract the airfield altitude when

checking height for obstacle clearance. Of course, QFE is no use at all if you intend to land at another airfield. So, before leaving the circuit, the altimeter should be set to QNH.

On the way, with the altimeter set to QNH, you have a good view of altitude above sea level to use for terrain clearance and so on. When you approach your destination, the weather there may be different from the weather you left behind, and you should acquire a new QNH or QFE setting to use on the approach.

If you're travelling a long distance, it also makes sense to check QNH periodically. What happens if the weather changes? The old saying runs "High to low: beware below." If you travel into an area of low pressure from high pressure, your altimeter will read artificially high, and you will descend to compensate. This can be very dangerous around high ground or obstacles. The UK is divided into a number of "Altitude Setting Regions" (ASRs), and pilots are expected to obtain a new QNH on crossing the boundary into a new ASR. That's one way of making sure that you stay above the terrain.

The other reason for standardizing altimeter settings is to maintain separation between aircraft en route. If you're east-bound in the US, flying on instruments, you should be flying at an odd thousand feet. That promises 500' separation from westbound flights. But it only works if you both have your altimeters set to the same air pressure. This is life-and-death stuff!

To ensure standardisation, once you get above the terrain, everyone uses the same pressure setting of 1013.25 millibars / hectoPascals or 29.91 inches of mercury. That's purely to avoid mid-air collisions caused by a difference in altimeter settings. The altitude where it's safe to switch over to this setting is called the transition altitude, and it varies from place to place, depending on the height of the mountains. In the relative flatness of the UK, transition is at 6000' or less (it even varies from airport to airport). In the US it is much higher. Above transition altitude, feet are no longer used, and are replaced by "flight levels" of 100' each. Flight Level 210 is equivalent to 21,000'.

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Once the DME reads two nautical miles to go, you are too near for the CDI to be any use. Even a small deviation (in yards) will look big on the needle. A good rule of thumb is that one degree off course over 60 miles of track is a one-mile deviation. So, at two miles out, one degree of deviation is only 176 feet!

Now tune in Santa Rosa VOR on NAV2, frequency 113.00. Adjust the OBS to find the correct bearing to fly. You should find it on 297 degrees. You can now fly toward Santa Rosa, using NAV2. As you do so, alter the OBS on NAV1 to 297 as well, and see what it's like to fly away from a VOR on a selected heading. Continue to climb until you reach 4,500'.

The usual practice is to track away from one VOR (Scaggs Island in this case) until half-way to the next one (Santa Rosa), then start tracking towards the destination. The reason for this is that the nearer VOR will always give the more accurate course information. See whether you can tell the difference on this flight. Remember to switch the DME over to NAV2, and halfway is about 14 nm on the DME.

At 10 miles out from Santa Rosa, begin your descent. You should be nicely positioned to join the circuit for runway 01/19 or 14/32. The runway altitude is just 125' AMSL, and the VOR is located on the airfield, so you can follow it right in until the runway is visible. Happy Landings!

Once you've come this far, perhaps you'd like to try the return trip? You only need to use Scaggs Island VOR, but tracking outbound on a bearing of 110 degrees for 19 miles to reach Buchanan Field should be a nice test of your skill with the CDI.



Begin descent into Santa Rosa



Landing-Santa Rosa



Homebuilders' Corner

By David Lewis

This issue assembles the Tiger Moth. To make things simpler, I've provided all the remaining parts in the file TMOTHPT2.AFX that is available at the *Full Throttle* Web site (www.ftmagazine.com).

There was nothing interesting or difficult about building them, it's just a case of measure and make, measure and make. The only things I haven't made are the rigging wires, or the anti-spin strakes fitted to most Tiger Moths from 1940 onwards.

But first, let's look at what was wrong with the plane as you assembled it last time. If you didn't get last issue's instructions, my own parts are available in the file TMOTHPT1.AFX, also on the *Full Throttle* Web site.

The first problem that strikes the eye is the color—a uniform mid grey. However, we can leave that until we do the paint job. More serious is the lack of curve about the top of

the fuselage. Looking at my drawings, it seems that the upper fuselage is curved, while the lower part is more angular. One of the features of components is that they can be made "smooth" (i.e., rounded), so we can use that feature on the upper part, but split up all the components into two so that the lower half remains "regular" and angular.

To split a component, F02 for example, select Components, then **File | Load F02**. Click on part F02A, and press the **[Del]** key. After confirming that you mean it, the part is removed. Do the same to F02B, F02E and F02F. Save the component. Now create a new component (**File | New**) with all the parts in it that you just took out of F02. Save this component as F02U, with a description of "Fuselage 02 upper." Repeat for all the rest.

Go to the Assembly line, and add all these new components to the aircraft. Now double-click on F02U and pull down the choices for Application (it starts off as "Regular"). Change it to "smooth" (see image bottom of the page).

You may have wondered why all of the F04* and F06* parts weren't assembled into

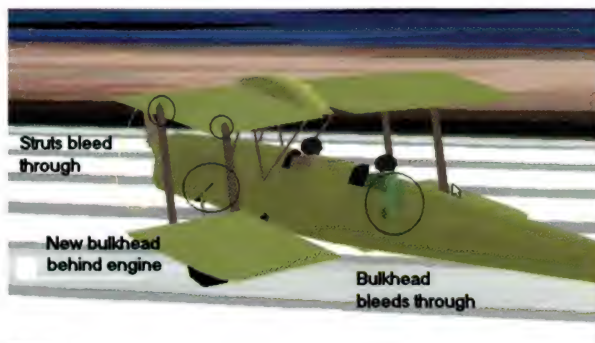
components. Well, the easy way to find out is to try it. You'll see that components are invisible from the inside, so when you look at the plane from above, you can see right through the floor. Try the same thing with just parts, and the floor is solid. That's useful, but of course parts can't be made "smooth." So, there's another decision and more planning involved there!

What else was wrong? F02 doesn't fit perfectly in front or behind. That can be fixed by creating two bulkhead parts: one for the front and one for the angled section joining F03. These are both built and included in my sample, TMOTHPT2.AFX. I've also colored the parts differently, to see problems easier (see image below).

Another problem is that the bulkheads that do exist, fore and aft of the two cockpits, occasionally show through the cockpit sides. This is a typical problem with automatic gluing. Aircraft Factory has positioned the automatic glue between the centers of the two parts, but the centre of the bulkhead is as high as the top of the cockpit side. So, seen from above, and near to side-on, and

DH82A Tiger Moth Objects	File	Assembly Group	Seq	Effects	Use as	Color
Fuselage 02	F02	Nose	*** C	Always	Regular	[G]Yellow
Fuselage 02 upper	F02u	Nose	*** C	Always	Smooth	[G]Yellow
propeller	prop	Nose	*** P	RPM, below (Z)	Regular	Tan
prop swirl	swirl	Nose	*** P	RPM, above (Z)	Regular	Gray, ligh
	F02n	Nose	*** P	Always	Regular	[G]Yellow
Engine block	engstruc	Nose	*** S	Always	Fore bulkhead	[G]Yellow
Prop spinner	spinner	Nose	*** S	Always	Regular	[G]Yellow
Fuselage 07	F07	Body, main	*** C	Always	Regular	[G]Yellow
Fuselage 07 upper	F07u	Body, main	*** C	Always	Smooth	[G]Yellow
footprint	foot1	Body, main	*** F			
	F07u	Body, main	*** D	Always	Blank	Blank

Fuselage 02 upper	
Assembly Group	Nose
Assembly Group Color	Yellow
Application Type	Smooth
Sequence	[0]
Object Color	=> Group Color
Object Art	
Set Art Options	
OK Cancel	



Body, Main	
Canopy, High Wing	tank, luwing (x2)
Gear, center	wheel, whstr1-4 (all x2)
Nose	f02, f02u, f02n, prop, swirl, spinner, engstruc
Tail	f08, hstab (x2), tstrut (x2), rudder, skid1, skid2
Wing, low, left	llwing (reg), wgstrutr (opp), wgstrutf (opp)
Wing, low, right	llwing (opp), wgstrutr (reg), wgstrutf (reg)

close to the aircraft, the gluing will go wrong. I'll show you how to fix this with manual gluing.

But first, we have so many parts here we absolutely must organize them into assembly groups (see table above).

This reduces the number of objects in the Body to a nearly manageable 34. As you'll see later, using assembly groups saves adding manual glue, but it also helps automatic gluing, because the fewer parts that are in an assembly group, the more likely Aircraft Factory is to glue them correctly.

If you are wondering what some of the new parts are, by the way, click on the name in the assembly list, and then take the shuttle bus to the blueprint. The selected part will be highlighted in blue.

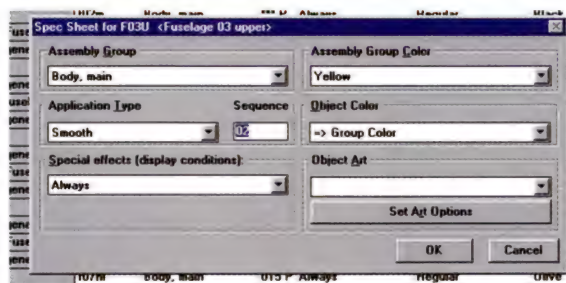
If you produce the aircraft at this stage, you should see that the number of bleed-through problems is now quite low: fuselage bulkheads are still trouble, and the left-hand tailplane seems to show through the fuselage from a behind-and-right view. We'll fix those now, with manual glue.

Glue

Go into the parts shop, and click on **File** | **Import** from storehouse. Select the part called *g_vert*, which is a triangular glue part to join two things that are in front / behind. There is another standard glue polygon called *g_horiz*, which deals with left / right pairs. Save *g_vert* as *gvert*, with type "Template: glue."

Next, go to the assembly list and assign sequence numbers to the key fuselage parts. This is a way of showing the sequence from front to back, and is a necessary step before gluing. The sequence numbers I used are:

```
02 f03u
04 f03m
06 pbody2 (make sure you get
the right ones of these two!)
08 f05n
10 f05, f05u
12 f05m
14 pbody2
16 f07n
```



Now add the new glue part gvert to the list. Double-click on it to open the Spec sheet window, and give it sequence number 3. That will put the glue between the forward fuselage (sequence 2) and the bulkhead at the front of the cockpit.

Click on gvert to select it, and switch to the assembly blueprint. In the side view, drag the glue template to just cover the bulkhead f03m.



Next, add another gvert, with sequence number 05 (the join between that bulkhead and the pilot's body). Position this one on the front bulkhead as well.

Another gvert with sequence number 07 needs to go on the bulkhead behind the front pilot, and so does gvert sequence number 09. Glue polygons 11 and 13 go on the bulkhead at the front of the second cockpit, and sequence number 15 goes on the bulkhead at the back.

If you now save your work and produce the plane, you should find that the rear cockpit is behaving itself sweetly, while the front cockpit has a particular problem with the lower left panel (f04c).

I can't tell you how frustrating that front cockpit was to fix! It's just a wonder I have any hair left at all. The problem lies in the rule for automatic gluing (p.64 of the manual): the two nearest parts are glued together. Because the front cockpit is not as deep from front to back as the rear cockpit, but is actually deeper from top to bottom, the side panels are tall and thin. Also, they are nearer to the bulkheads in front and behind than they are to the pilot's body (which is our key glue object).

Manual glue can only be put between sequential objects, so the side panels can't be manually glued to the pilot's body.

More glue

Something else is not right. The left tailplane shows through the rudder when viewed from behind-and-right. That can be fixed by moving parts hstab and tstrut to assembly groups "Tail, left" and "Tail, right." We have two of each part, and one should go in each group.

Similarly, the struts that hold up the fuel tank from the forward fuselage bleed through the fuselage from some angles. This can be fixed by putting them in an assembly group called "Innerwing, mid, left" or "Innerwing, mid, right." This is audacious, since they are nothing like a wing; but they are positioned to the side of the fuselage, nearer the fuselage than the main part of the



wing, above the low wings and below the upper wings. In that sense, this is the perfect assembly group for those parts.

A close look at f05 suggests it may be peeping through f05u from some angles, and the same goes for f03 and f03u.

Also, the pilots' heads seem to be glued to something other than their bodies—very disconcerting for them!

Some of you may have seen a TV series called "Plane Crazy," in which Bob Cringely attempts to design, build and fly a plane of his own in thirty days. If you haven't seen it, look out for it; it is highly entertaining and informative. It will not ruin the experience for you to be told that day 30 is a serious low point. He did not make it in time. For therapeutic benefit he took a broomstick and beat several parts of his garage to death, then went outside and shouted at the sky. This is exactly the feeling you get when trying to persuade Flight Shop to correctly glue a complex arrangement of parts together.

The worst part of this for me is that I have coded SDL directly, and know that all of this could be easily fixed that way. Once we get our planes off the ground, I'll show you how it's done. But for now, I want to get the best result possible without resorting to such extreme measures.

Some of the solutions I considered for the cockpit problem were:

- ➔ Make the front cockpit deeper, so the gluing works with me rather than against me. Good idea, but it wouldn't be accurate.

I saw these two Moths at Farnborough airshow this year and couldn't resist taking the picture. G-AMTV would make a great subject when we come to paint the moth.



- ➔ Create a dummy part, just a single point, located *inside* the pilot's body. The gluing rules would have to glue that to the body. Then, manually glue that to the side panels. But the manual gluing happens first, an arbitrary centre point is generated, and the whole doesn't end up being glued to the pilot after all.

- ➔ Glue all the panels together!

Simply glue the upper side panels (f04b/f) to the lower ones (f04c/g). To do that, you can import the generic horizontal glue template from the storehouse, just as you did for gvert, and create a sequence like:

22 f04b

23 ghor

24 f04c

26 f04f

27 ghor

28 f04g

The result is not perfect, but can be fixed later.

Eventually I found a purely Aircraft Factory solution. Split all the vertical bulkheads into a top part and a bottom part. The top part stays glued in the chain, with the upper fuselage and the pilots' bodies. Build the bottom part into a similar chain with the lower fuselage components.

This took me about an hour and a half just to make the changes (about three days to think of the idea), so as a precaution I first backed up the .AFX file (created every time you Produce the aircraft). Just using file manager or Windows explorer, copy TMOTH.AFX to another directory in case you need to bring it back later.

As part of this change, I built the lower parts f04c/d/g/h and f06c/d/g/h into a pair of components, which could be included in the glue chain.

The other problem parts were the cockpit doors (f04b/f and f06b/f), that kept disappearing. I fixed these by declaring them as innerwings, which gave them all the right characteristics for when they should be visible.

Special Effects

Special effects generally refer to pieces of the aircraft that only appear under certain circumstances, such as landing gear (when the undercarriage is down), flaps, lights and strobes. None of these really apply to the Tiger Moth, unless you want to model the leading-edge slats that pop out automatically at low speed.

However, by convention, the propeller is only visible at low RPM, and the swirling disk around it appears at high revs. To do this, go into the list of objects and double-click on the propeller to open the spec sheet for it. Click on Special Effects, and scroll down to "RPM, below (%)." An extra field appears below for you to enter a percentage; I've used 20%. The same technique lets you set the prop swirl to appear when "RPM, above" 10%. This gives a narrow overlap window, which seems appropriate to me.

The other special effect I'd like to apply is to make the front-seat pilot optional. Since so many of the usual moving parts don't apply to the Tiger Moth, I've decided to treat him as a kind of spoiler. After all, the plane will go slower with a second occupant! So, select the appropriate pbody2 and head parts, and set their special effects to "spoiler, extended." However, until we get to the flight dynamics, you won't be able to extend any spoilers, so the front seat will remain empty.

Final points

The last things to set up in Aircraft Factory before the paint are the viewpoint, centre of rotation and footprint. Beginning with the viewpoint, go to the Assembly line, and select **Options | Set View Centre**. Click on the head of the pilot in the rear seat, which sets that as the center of view for the aircraft, i.e., the position of the pilot's head!



The Centre of Rotation is set in the same way, but for this plane it's already correct. Remember to put your details on the Assembly window for designer, date, and so on. These show up later when selecting an aircraft to fly.

Finally, the footprint defines the position of the landing gear. Go into the parts shop, and select **File | Reference | Assembly TMoth**. Pick a side view, then click on the bottom of the prop disc, the bottom of the main wheel, the tail skid, and then the bottom of the main wheel again. Then switch to a top view, select on-screen-editing (**Ctrl** + **O**), and move the two wheel points to the middle of the main wheels, creating a kite-shaped part. Save this as *foot1*, and make the Function "Template: Footprint."

Switch to the assembly list, and add the part *foot1*. Now produce the aircraft, and see what you get! My work to this point is available in the file *TMOTHPT3.AFX*.

The amazing thing is that already the plane flies like a taildragger, and so long as you remember to leave the gear down it has a top speed of about 85 knots. Next time we'll sort out the paint work before getting the flight dynamics just right.

If you have any comments on this column, please let me know.

For More Information

You can contact me at:
DavidS_Lewis@uk.ibm.com

Problem planes No. 4—It's all too complicated!

This issue's problem is what to do when your aircraft becomes too complex for Flight Shop.

First, let's just understand what we mean by complicated. At the root of all aircraft is a language sometimes known as SDL. We'll look more closely at SDL in a later issue, but it's the same language that describes buildings. SDL used to have a restriction (until FS98) that Subroutine calls could not stretch further than 32,768 bytes. So, any aircraft with much over 33,000 bytes of SDL is simply not going to work.

The designers of Flight Shop realized that this limit is difficult to visualise, so they came up with a different kind of limit. You can only have 150 parts plus 25 components plus 25 structures in your plane. That balance may not be the one you want, but it usually keeps the size under 33K.

Flight Shop applies another artificial limit to the number of polygons. So, if you create a component (like *F03U*) with four polygons, that's cheaper than one with eight polygons or twenty-six.

How do you know that your model is too complex? If you go over Flight Shop's artificial limits, you will be told and will not be able to produce an aircraft. You can check whether you're getting close by going to the assembly line and selecting **Options | Report Statistics**.

What the Flight Shop limits don't tell you is that textured polygons use more bytes than plain colored ones (nearly four times as many), while smooth polygons use about half as much again as regular ones. So it's possible to produce your plane with the Aircraft Factory, but when you try to fly it, it won't display. Sometimes you get an invisible aircraft (stealth technology has been perfected), and sometimes you get a "database error" and have to exit the simulator. One option to greatly simplify your model is not to put textures on so many surfaces. Then you can put them back on one at a time until you reach the limit. No more scientific approach is available.

Is it always this difficult?

If this project seems tough, don't despair. I've deliberately chosen a difficult subject in order to cover a lot of ground. As a complete contrast, it's possible to build a modern, single-engine plane in much less time. Here's my recipe for a quick touring machine:

- ✈ Draw the side view from just behind the prop all the way back to (and including) the tail. Save that as a side template.
- ✈ Draw the top view of the fuselage, and save it as a top template.
- ✈ Go to the Structure shop, load both templates, and place the bulkheads from the nose to the front of the windscreen. Manufacture it and save it as *fuslg1*. Use octagon bulkheads.
- ✈ Make two more structures from that point to just behind the wings, and from there to the tip of the tail. Save them as *fuslg2* and *fuslg3*.
- ✈ Add them to the assembly in the nose, body and tail assembly groups.
- ✈ Draw an aerofoil shape for the wing, and save it as a side template.
- ✈ Draw the top of the wing, and save it as a top template.
- ✈ Make a structure for the wing using a rectangle bulkhead.



How I Make Scenery

Part VI: Natural Geographic Features II—Mountains

By Justin Tyme

Justin Tyme continues his series on scenery design. Mountains are one of the most spectacular geographic elements that you can add to enhance a scenery package. In this installment we will explore techniques for creating realistic mountains using Airport & Scenery Designer (ASD) from Abacus.

One of the most spectacular geographic elements that can enhance a scenery package are mountains. Done well and done right, they can propel a ho-hum project into a “must-have.” In this installment we will explore techniques for creating realistic mountains using Abacus’s Airport & Scenery Designer (ASD).

Reference Sources

Before we begin working, let’s gather our reference sources. No one should build a house without first studying the blueprints. One of my favorite resources is Delorme’s Atlas & Gazetteer series. These maps offer an accurate and easy-to-use reference for topographical and land use data that is useful to any scenery designer. Most of the United States are available. You can either order these directly from Delorme at their Web site, www.delorme.com, or in most cases purchase your state at a local bookseller. They are in the \$16-20.00 range and are well worth their reasonable cost. Another resource I use is Delorme’s 3D Explorer. Although 3D Explorer is not so useful in the actual design process, it is very good for getting the “feel” of a geographic region by “flying” over the terrain in 3-D. Delorme has also recently released a new product, Topo USA, which covers the whole United States in contour lines. This is sure to

become my reference source of choice as it takes the Atlas & Gazetteer series to a new 3-D level, combining the best of the Gazetteers and 3D Explorer into one package. Topo USA retails for about \$100.

Topographic maps obtained from the USGS may also be helpful. These are cheap and available directly from the USGS at www-nmd.usgs.gov/. Maps in various resolutions covering every area of the US and territories can be ordered online from this site.

Okay, now that we have our reference sources handy, let’s build some mountains.

3-D Polygonal Mountains

Here, we are referring to the visual scenery (section 9) of the Microsoft Flight Simulator (MSFS) scenery engine, not synthetic (sections 1-6) mountain tiles.

The Appalachian chain cuts through the heart of Pennsylvania, and I’ve chosen a particularly interesting area to the northwest of Carlisle. Using our reference sources, we’ll tackle this challenging area in PANJ98, my latest scenery release.

You’ll notice in Figure 1 that we have a very unusually shaped ridge surrounded by relatively flat prairie/farmland. This type of situation is ideal because it does not exceed the limitations of the MSFS

scenery engine. Since we have already (or should have by now) set the base elevation of the area and defined the land-use characteristics with our synthetic tiles, we can now build some realistically shaped mountains by using the ASD Mountain Tool.

We can speed up the creation process considerably by first setting the Global Preferences for mountains under the ASD **File** menu. Click **File | Preferences**, then the *Region* tab. Click the Mountain radio button, then the *Style* tab.

The Delorme Pennsylvania Atlas & Gazetteer tells us that the contour interval of the map is 50 meters. By counting the contour rings on the map, we find the mountains in this area have about six or seven rings to them, on average. Fifty meters times six rings equals 300 meters. So, on average the mountains in this area are 300 meters above the base elevation. So, let’s set our global mountain preferences to “Twin Peaks” and the height to 300 meters for Peak 1 and 280 meters for Peak 2. Don’t forget to click the *Texture & Color* tab, too. We’ll set

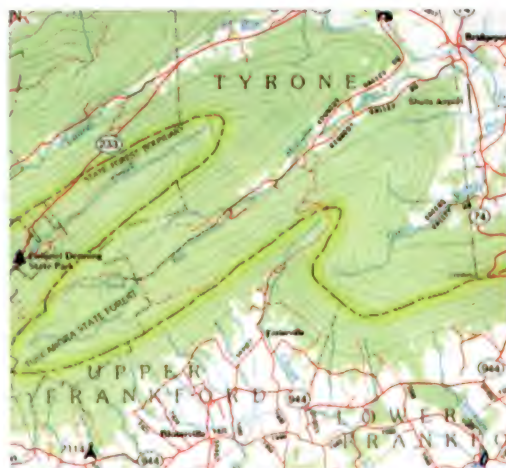
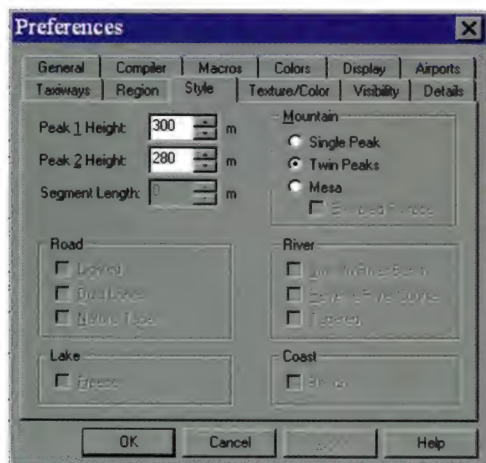


Figure 1

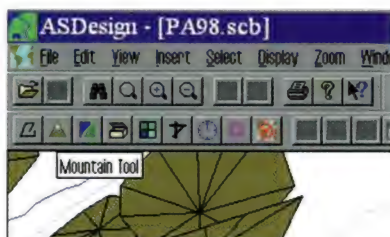
Notice this a very unusually shaped ridge surrounded by relatively flat prairie/farmland.

it to use the default texture BROAD_M.R8. We can always change individual mountains later when we're fine-tuning.



At this point we need to discuss one important aspect of designing mountains with ASD. The program gets a bit confused if you draw a complex or irregularly shaped mountain. ASD algorithms will usually cause the texture to be drawn on the inside of the mountain whenever it encounters a concave external surface. Therefore, we don't want to draw any horseshoe-shaped mountains, or chances are some facets of them will be see-through. Also, if the RefPoint of a mountain happens to fall outside of the mountain's base, we are asking for .BGL coding errors and possible lockups. Remember the "glass mountain crash" problems experienced in some sceneries, including previous versions of my Pennsylvania? This is one cause of them. Keep your individual mountains as simply shaped as possible to avoid problems.

With this limitation in mind, how then do we draw complex and irregular-shaped mountains? Easily; we combine several individual mountain regions into one.



Click the Mountain Tool and draw several twin-peaked mountains roughly depicting the shape as shown in your reference source (in our case Figure 1). This is a complex shape, but we can attain what we want by drawing about five mountains, as shown in Figure 4.

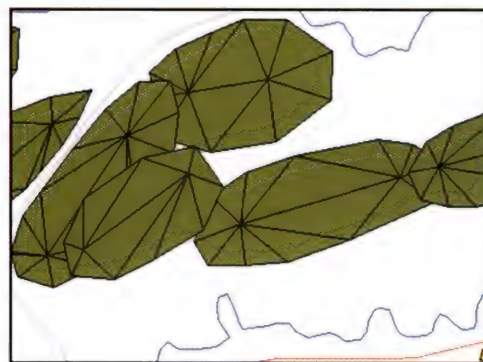


Figure 4

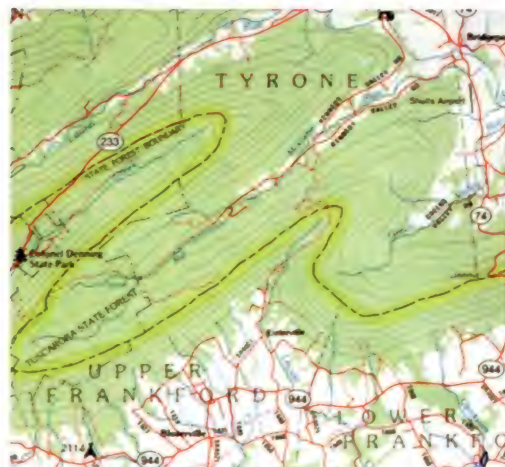


Figure 1

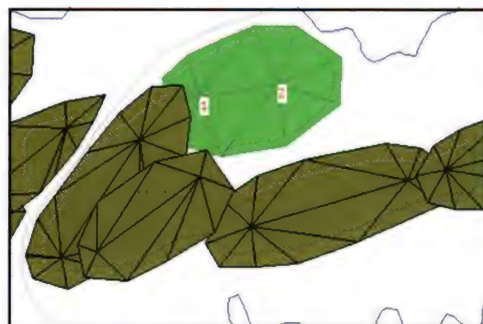


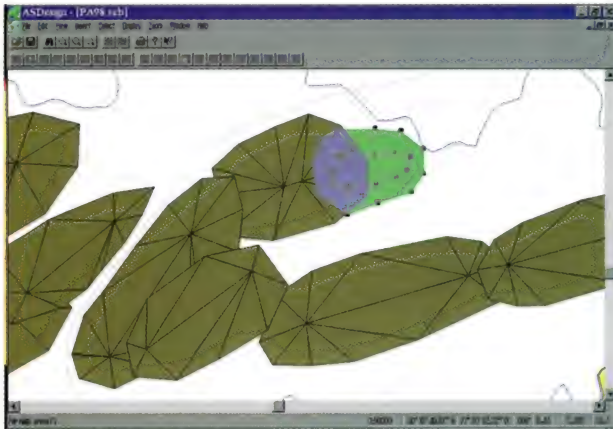
Figure 5

Now, again looking at our reference source, we can fine-tune these virtual mountains to match the real mountains as closely as possible. Looking at figure 5 and correlating the same mountain to the real-world in figure 1, we notice that this part of the mountain rises to a peak about 100 meters higher than another part of the mountain just to the southwest. So, let's edit the peaks and increase their elevation to match what we find on our reference source.

Right-click on the mountain and choose **Properties**. We count the rings up to this peak and find seven of them. Seven times 50 equals 350 meters, so let's set the height of Peak 2 to 350 meters and Peak 1 to 325 meters. Click OK. Then right-click on the



mountain again and choose **Edit**. Move the peak handles closer together. We also notice that the northeast slope of the mountain is steeper on about the top two-thirds, with a small table-like area about one-third of the way up. So, we will pull in the handles a bit on this side to make the slope steeper, and add a small mesa-style mountain about 150 meters high, adjusting the handles to imitate our reference source. The result is shown in Figure 6.



Now, let's move in a counter-clockwise fashion, adjusting all the mountains according to what we find in our reference source. The result of my editing is shown in Figure 7.

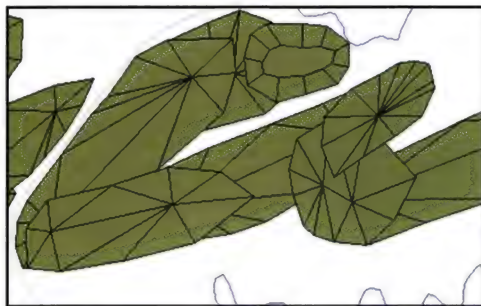
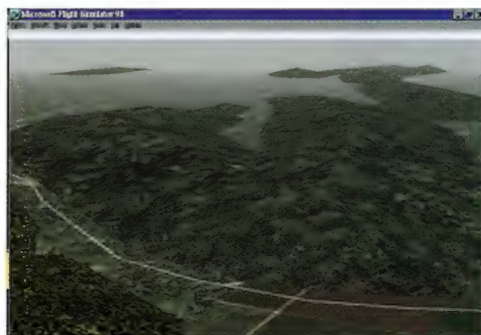


Figure 7

Comparing Figure 7 with Figure 1, we find that we've captured the essence of the real world pretty well. Let's compile our work and take a look at it in MSFS.



So, by using the three basic ASD mountain types in various combinations, we can achieve effects limited only by your imagination.

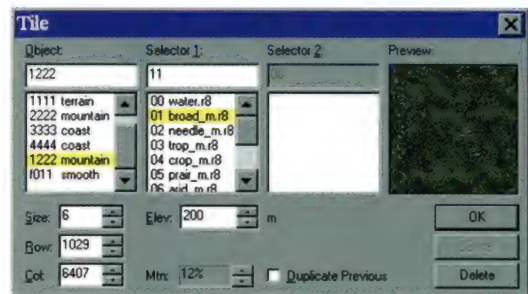
Synthetic Tile Mountains

Another method for creating mountains is to use synthetic mountain tiles (sections 1-6, or tile sizes 1-6) instead of section 9 3-D polygons. This method can create some nice effects, too, but results in mountains with perfectly square bases—not very realistic. But we can fix this square effect by mixing synthetic and section 9 mountains.

It wasn't until FS98 that we were finally able to have textured synthetic mountains. Previous versions of MSFS allowed only the infamous "green blobs," which were somewhat shaped like mountains but really didn't "look" like mountains. But since FS98 allows for textured mountains, this method certainly deserves some mention and is actually very helpful in areas where the section 9 scenery is very dense as a means to alleviate memory buffer problems. Synthetic mountains do not consume precious section 9 memory buffer space, which is limited to 512 K in FS 98. The buffer space is defined as the amount of section 9 scenery within a defined radius around the aircraft location. 3-D polygonal mountains, created with the ASD Mountain Tool, use up some of this memory. Synthetic mountain tiles do not.

If you have larger areas of mountainous wilderness to depict, synthetic mountain tiles is probably the best method to do it. But if you have many roads or rivers running through the area, the synthetic mountain method is not conducive to successful building, since it is not possible to display these features on top of mountain tiles.

Pick an area of your scenery that doesn't have roads or rivers running through it and click on the Tile Tool.



In the Object box you'll want to select "1222," which are the textured synthetic mountains. Under the Selector1 box, choose your texture. It will show up in the Texture Viewer. Select the size of the tile and set the base elevation. You'll see that the Mtn: box is now active. You have a choice between 12%, 25%, 50% and 100%. This will set the height of the synthetic mountain tile. You'll have to experiment to see what works best for your particular situation. For rolling hills I use 12%; for a slightly more "bumpy" appearance use

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25%; for very severe and craggy mountains like the Rockies use 100%. As I say, experiment and you'll get a good feel for what works best.

You can also combine variously sized tiles on top of each other. For instance, try a size 5 tile, and place two or three size 6 tiles on top of it and see what it looks like. Again, half the fun of designing scenery is experimenting, so feel free to try different things.

One of the drawbacks of using the synthetic mountains is that they are perfectly square around their bases. But you can minimize this problem by adding a few section 9 polygonal 3-D mountains at the edges of the synthetic mountains to make the base appear more irregular. This could result in some unusual drawing order effects between the synthetic mountains and the section 9 mountains, but in most cases it is not too noticeable and not a big problem. To me, the square bases are a bigger problem, so go ahead and use a mixture of mountain types.

Elevated Hard Surfaces

The ASD Mountain Tool has a clever option under the *Style* tab of the Mountain Tool that allows you to turn a mesa mountain into an elevated (landable) surface. This makes it possible to place an airport on the top of a mountain, or on the side of a mountain by combining the mesa with one or several twin-peaked and/or single-peaked mountains.

Click the Mountain Tool and choose the *Style* tab. Determine your airport's elevation. Looking at your topographic reference source, determine approximately how high the mesa mountain should be. Subtract this value from the airport's elevation and set the tile under the airport to the difference. In other words,

$$\text{tile elevation} + \text{mesa height} = \text{airport elevation}$$

One thing you will notice about the tops of the mesa-style mountains is that the texture will create an unusual visual appearance, as if the depth perception is confused. This is a bug in ASD, which will be corrected in the next version. But the effect can be dealt with by extending the airport property polygon to roughly match the shape of the top of the mesa. In other words, I use as small an elevated surface as possible, just enough to place an airport on top, and fill in the surrounding area with twin-peaks and single-peaks as needed.

Another thing to remember about elevated surfaces is that the use of other 3-D objects, such as hangars, buildings and other such objects is problematic. I can't say it's impossible, and *Full Throttle* Editor Tim Dickens says he has figured it out, but getting 3-D objects to appear on elevated surfaces is certainly a challenge to all but the most advanced designers.

The same general rule about complex shapes applies to mesa mountains as to the others. Keep the shapes simple. If the situation requires a complex shape, combine two or several mountain regions into one. Again, experiment, experiment, experiment.

Okay, happy building and we'll see you next time, when we will enhance some coastlines using Luis Sa's *Beaches* program!



Santa's FBO



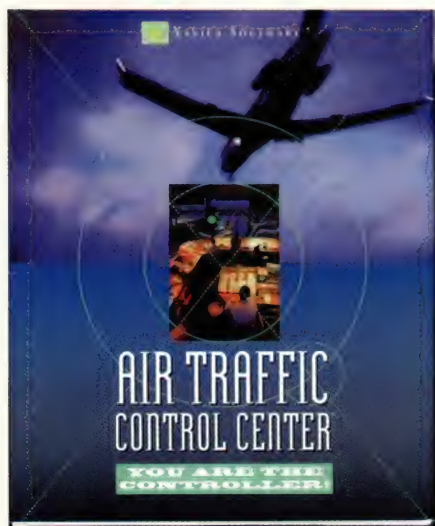
Full Throttle's Christmas Shopper's Guide

What's Santa going to deliver to flight simmers this season? The following hardware and software can enhance your flight simulation experience. The large variety of items is presented to you by category. Prices listed are the manufacturers' suggested retail prices (MSRP). Manufacturers and their products are listed in alphabetical order, by company name.

General Aviation Flight Simulators

Air Traffic Control Center

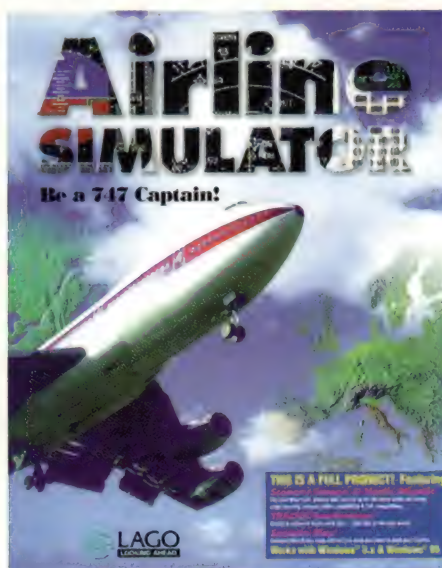
ATCC is an authentic enroute air traffic control simulator. Your job is to handle the flow of planes in and out of the New York, Chicago and Los Angeles enroute centers. You control the traffic at a realistic radar display to keep the planes safely moving through your air space in one of six sectors. Uses digitized "push-to-talk" audio. Includes training manual. For Win95 or Win98. \$59.95



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76 Cranbrook Rd #204
Cockeysville, MD 21030
800-848-9100
<http://www.xavius.com>

Airline Simulator 2

This simulator is for airline aficionados who want to fly the MD-83, MD88 and B747-400. Nommisoft couples brand new flight models with all new cockpits made of authentic high tech instruments that recreate the look and operation of a real airliner. Includes more than 1600 airports. The 300 page pilot's manual shows you how to fly the big ones. \$150.00



Nommisoft, GmbH
Salzburg, Austria
<http://www.nommisoft.com>

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You can fly this general aviation simulator throughout the San Francisco Bay area - 11,000 square miles - from 48 different airports. The terrain and buildings are rendered in 3D. The aircraft are the Piper Arrow, DHC Beaver seaplane, P-51 Mustang, Beach Baron twin, and a trainer. Has voice ATC and 3D graphics video acceleration. For FS95 and FS98. \$39.95



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651 Brannan Street, 4th Floor
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415/547-1200
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Microsoft Flight Simulator 98

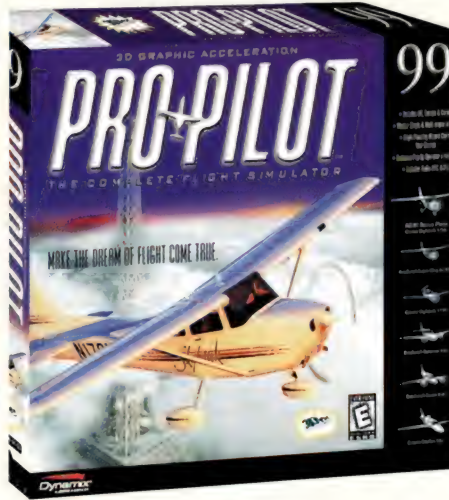
This is the standard by which other simulators have been judged. Flight Simulator has been selling for 16 year, and has all of the features of a mature product. Most of all, it is an 'open' system which makes it a favorite for third party add-ons – hundreds are now available for users of FS. For Win95 or Win98. \$59.95



Microsoft Corp.
One Microsoft Way
Bellevue, WA 98009
<http://www.microsoft.com/games/fsim>

ProPilot 99

Sierra's ProPilot 99 now sports 3D video card acceleration with new graphic effects such as hazing and sun flare. All of aircraft flight dynamics have been tweaked to ensure accurate modeling: Cessna 172R and 172P, Beech Bonanza V35, Baron B58 and King Air B200 and Citation Jet 525. ProPilot 99 has voice air traffic control and 3D terrain covering 38 million square miles of scenery, 3500 airports and 35 major cities. Sierra and the National Association of Flight Instructors jointly developed 48 online tutorials for PP99. For Win95 or Win98. \$59.95



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Laminar Research
1005 Brentwood Crt
Columbia, SC 29206
803/738-0910
<http://www.x-plane.com>

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Available for free download.



InterActive Magic
P.O. Box 13491
Research Triangle, NC 27709
919/461-0722
<http://www.imagicgames.com>

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San Mateo, CA 94404
800/245-4525
<http://www.janes.ea.com>

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Full Throttle Christmas Shopper's Guide

JSF - Joint Strike Fighter

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Red Baron 3-D

Sierra's well-known Red Baron is back, this time with support for 3D video acceleration and visual flight enhancements. RD3D now has 40 World War I era planes. You can use Dynamix's "Mission Builder" creates random missions or famous aerial battles. The new "Plane Paintshop" lets you customize your battle aircraft. Supports online multiplayer mode with tournaments. For Win95 or Win98. \$39.99

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<http://www.sierra.com>

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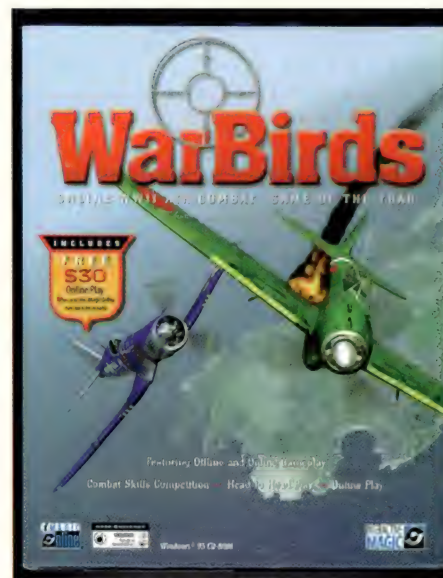
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<http://www.did-us.com>

WarBirds V2.0

WarBirds is the most popular online combat flight sim and this latest version adds 3D video graphics acceleration for more realistic battles. New aircraft are Me 109, Me 110, Hurricane and Spitfire. InterActive Magic has also enhanced the terrain and damage modeling and simplified the online connections. For Win 95 or Win 98. \$29.95



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Flight Sim Add-Ons

747 Jumbo Jet

This add-on gives you the jumbo in ten different models and has complete photorealistic panels and instruments with working gauges. Also includes scenery for six airports: Dusseldorf, and Frankfurt Germany and Cannes, Nice, La Mole and Frejus in France, and videos and photos of actual 747s in flight. For FS95 and FS98. \$29.95

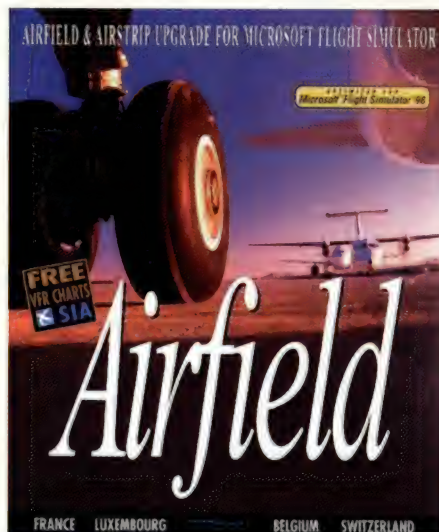


Alpha Software
168 Middlesex Turnpike
Burlington, MA 01803
781/229-2924
<http://www.alphasoftware.com>
and

Data Becker, UK
Bentley Industrial Center, Unit 9
Bentley, Farnham
Surrey GU10 5NJ U.K.
+44-1420-22707
<http://www.databecker.co.uk>

Airfield

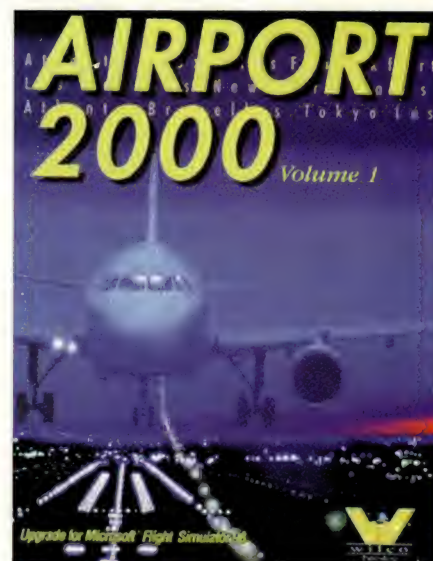
An add-on package with more than 300 airports in Western Europe – France, Luxembourg, Belgium and Switzerland, made with Papa Tango's "textural" textures. The scenery has all nav aids for IFR operation. Also new are these aircraft – C130 Hercules, P3 Orion, PC6 Porter, DHC6 and Beriev BE12. For FS95 and FS98. \$39.95



Papa Tango
15 Home Farm
Lutton Hoo Estate
Lutton Bedfordshire LU1 3RD U.K.
+44-1582-615-333
<http://www.papatango.com>

Airport 2000

An intensive scenery with very detailed scenery of some very well-known airports: Brussels Zaventem, Paris Charles de Gaulle, Frankfurt Main, New York JFK, Los Angeles LAX, Atlanta Hartsfield and Tokyo Nartia. Includes all new aircraft with jump seat views and working panels: B737-300, B777, A320, A340, DC-10, MD-83 and ATR-42. For FS98. \$42.00



Wilco Publishing
Chaussee de Ruisbroek 290
B-1620 Brogenbos, Belgium
+32-2-331-3290
<http://www.wilcopub.com>

Air Force One

Over the years, different Presidents of the United States have been ferried around the world in aircraft known as Air Force One Here are the "Presidential" aircraft that they have used 707-153 VC137-A(supply), 707-KC135-A/E (tanker), 707-E3-A (surveillance), 707 (retired Air Force One) and 747-200(current Air Force One). Includes photorealistic instrument panels For FS95 and FS98. \$29.95

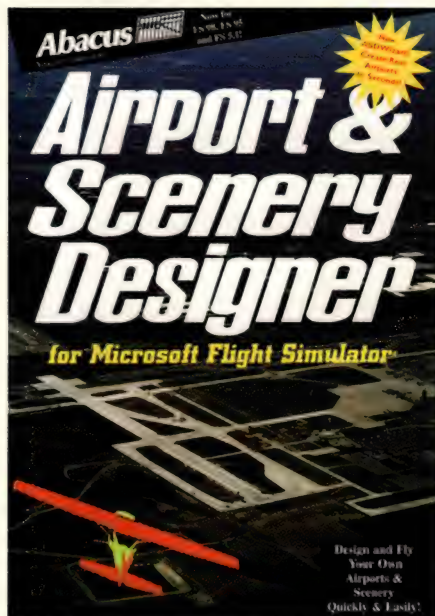
Alpha Software
168 Middlesex Turnpike
Burlington, MA 01803
781/229-2924
<http://www.alphasoftware.com>



Full Throttle Christmas Shopper's Guide

Airport & Scenery Designer

Make your own detailed airports complete with surrounding scenery using a "top-down" view based on maps and physical features. ASD lets you add cities, rivers, lakes, building, and more. The ASD Wizard lets you build small airports in just four clicks – and you can add more detail later. For FS95 and FS98. \$49.95.

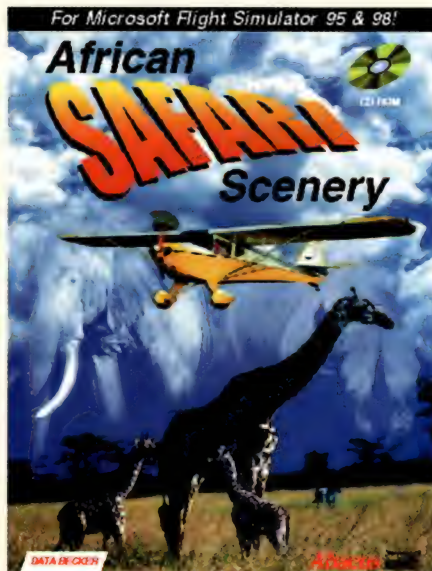


Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
800-451-4319
<http://www.abacuspublisher.com>



African Safari Scenery

This new add-on lets you take an aerial tour over the savannas, jungles and national parks of the darkest continent. Fly a new Cessna Caravan into remote areas and view the authentic wildlife: elephants, lions, giraffes, zebras, more. Visit exotic destinations such as Alexandra, Casablanca, Khartoum, Capetown and Nairobi. For FS98. \$39.95



Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
800-451-4319
<http://www.abacuspublisher.com>
and
Data Becker, UK
Bentley Industrial Center, Unit 9
Bentley, Farnham
Surrey GU10 5NJ U.K.
+44-1420-22707
<http://www.databecker.co.uk>

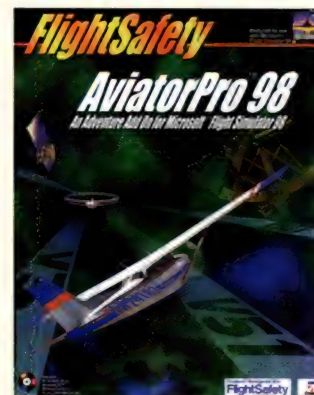
Around The World

This theme scenery brings you back to 1939 when Amelia Earhart embarked on her global flight in the famed Lockheed Electra. The replica aircraft and scenery are built to fly as if it were 60 years ago. Around The World is an educational experience and a historical challenge. For FS5.1, FS95 and FS98. \$39.95

Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
800-451-4319
<http://www.abacuspublisher.com>

AviatorPro 98

This add-on challenges you to improve your instrument flight skills. Each of the five complete adventures are graded so that you can review your performance. You'll fly IFR from Vero Beach to Orlando; Seattle to Yakima, WA; Grand Junction to Gunnison, CO; San Jose to Salinas, CA. For FS98. \$29.95



Flight Safety International
PO Box 11527
Daytona Beach, FL 32120
904/226-4900
<http://www.flightsafety.com>

Aviator Theme Park

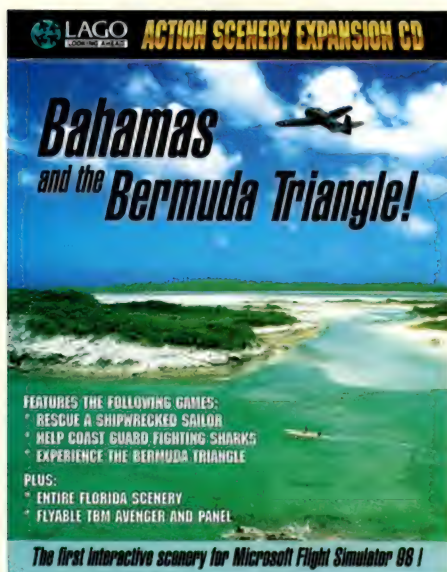
An interesting scenery unlike any you'll likely find elsewhere. Theme Park is four imaginary sceneries: Jungle, Metry, Sand and Canyon. Each has its own geographical characteristics and detailed, colorful textures and intricate 3D objects. Flying through Theme Park is like visiting a virtual world. For FS98. \$25.00



MunkWorks
5864 7th Avenue
Montreal, PQ H1Y 2N8 Canada
<http://pages.infinit.net/munk/>

Bahamas and Bermuda Triangle Scenery

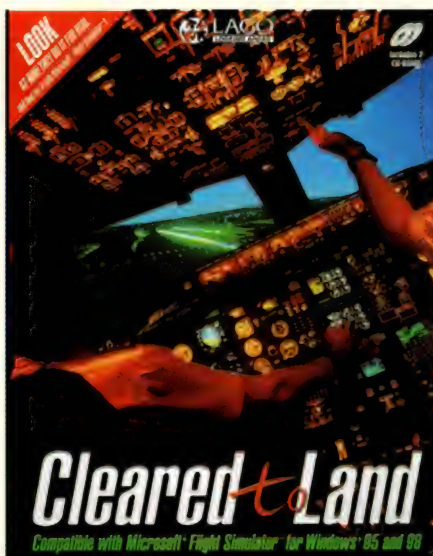
More than 3000 beautiful islands make up this scenery that's developed using all hand-drawn textures. Using Lago's new "active scenery" concept, they've added game-like interaction as you try to rescue the dolphins, stay away from the sharks and earn points. For FS98. \$39.95



Lago snc.
Via Garibaldi 30
I-22100 Como, Italy
+39-31-241-444
<http://www.lagoonline.com>

Cleared to Land

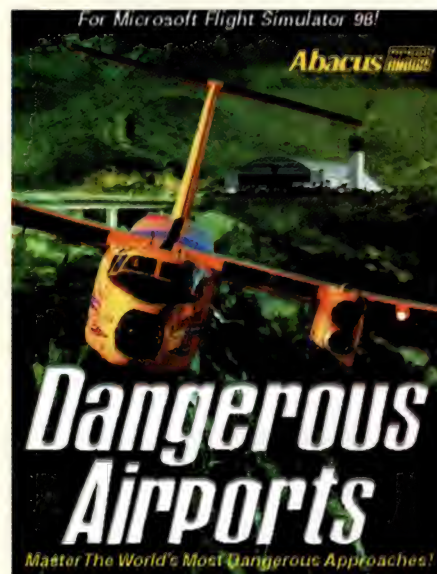
A unique package that combines both actual video footage approaches to six major airports and then the scenery and situations for you to try them yourself. Includes approaches to New York JFK, Budapest, Lugano, Brussels, Las Vegas, Acapulco, Malaga and Istanbul. On two CD-ROMS. For FS95 and FS98. \$39.95



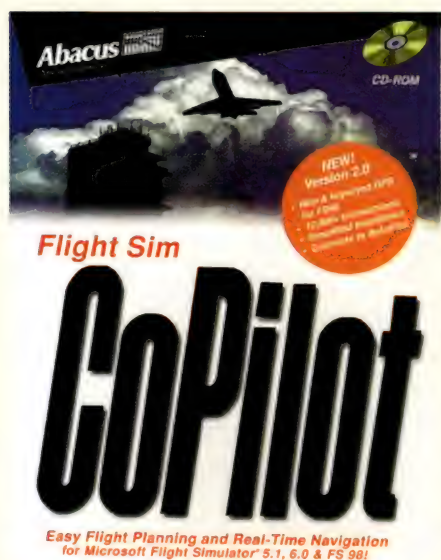
Lago snc.
Via Garibaldi 30
I-22100 Como, Italy
+39-31-241-444
<http://www.lagoonline.com>

Dangerous Airports

These ten newsceneries depict some of the most challenging approaches for pilots in real life. Fly to Dutch Harbor (Alaska), Funchal (Madeiras), Innsbruck, Kathmandu, Guatemala City, Aspen, Kodiak (Alaska), Akureyn (Iceland), Stromfjord (Greenland) and Templehoff. Pilot 4 new planes ATR-42, DHC Beaver Floatplane, Citation and Cessna 421 twin. For FS98. \$39.95



Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
800-451-4319
<http://www.abacuspublisher.com>



CoPilot Version 2.0

An "all-in-one" add-on couples effortless GPS navigation, moving map and printed airport diagrams, aeronautical charts and instrument approach plates. Simple, yet flexible three click flight planning with intersections and waypoints. Effortless navigation using GPS/autopilot link with automatic selection of waypoints. Works with any add-on scenery. For FS95 and FS98. \$39.95

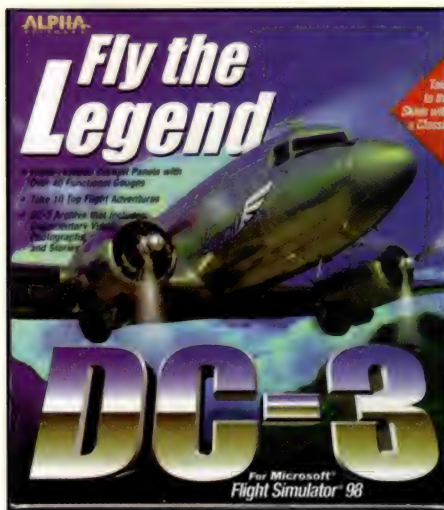
Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
800-451-4319
<http://www.abacuspublisher.com>



Full Throttle Christmas Shopper's Guide

DC-3

A collection of ten different models of the famous "Gooney Bird" and they're all decked out and ready to fly. These DC-3 aircraft have more than 40 custom gauges on new panels. The CD includes historical information, documentary videos and photographs of this classic plane.. For FS98. \$29.95



Alpha Software
168 Middlesex Turnpike
Burlington, MA 01803
781/229-2924
<http://www.alphasoftware.com>
and

Lago, snc
Via Garibaldi 30

Europe 3

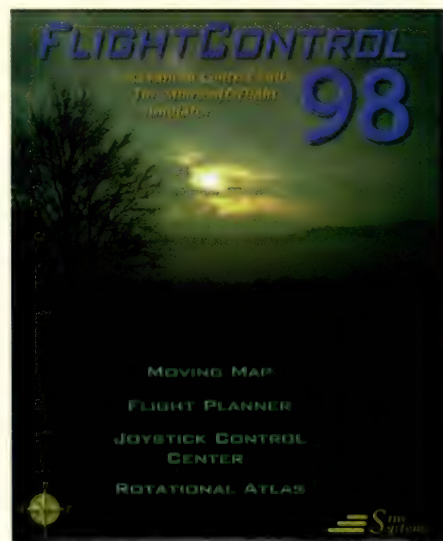
Covers the entire Great Britain south of the 54th parallel and includes England, Wales, the Channel Islands and the Isles of Scilly. It has more than 100 airports, navigation aids and detailed cities with many famous landmarks, buildings, roads, cities, mountains. For FS98. \$49.95



Apollo Software
Rosenkavalierplatz 18
D-81925 Munich, Germany
<http://www.apollosoftware.com>

Flight Control 98

The heart of this package is the moving map that displays airports, runways and navaids for "single screen" flying. The flight planner is capable of trans-oceanic flights and works with all third-part scenery. Also includes "joystick control center" for customizes control devices. For FS98.



\$45.00
Sim Systems, Pty. Ltd
P.O. Box 77
Cleveland, QLD 4163 Australia
+61-7-3822-6112
<http://www.simsystems.com.au>



Flight Director 98

This Electronic Flight Information System (EFIS) delivers navigation – navaids, moving map and GPS – as well as weather information on a single display. Flight Director 98 can use actual weather conditions as broadcast over the Internet to achieve even more realism. For FS98. \$49.00

Flight One
PO Box 14692
Atlanta, GA 30324
404/231-1180
<http://www.flight1.com>

Flight Sim Planner 98

Easily create flight plans using database of 10,000+ airports and 27,000+ worldwide intersections. Built-in viewer gives lets you print the airport layouts including runways, taxiways and aprons; maps with VORs, NDBs, ILSs and political and coastal boundaries; approach charts with vertical descent information. For FS98. \$39.95.



Aerosoft GmbH
Lindberghring 12
D-33142 Buren, Germany
+49-2955-760-310
<http://www.aerosoft.com>

FS Action! Scenery

This simple utility lets you easily add dynamic moving objects to your static scenery. You're able to control the frequency and path of the dynamic objects. Includes new moving objects and ability to import others using freeware DynKit. For FS95 and FS98. \$39.95.



Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
800-451-4319
<http://www.abacuspublisher.com>

FS Flight Deck – Blue Angels Edition

A set of twenty-five aircraft-carrier based planes that span 50 years of Naval history. This new special Blue Angels Edition adds eight new planes. In addition to the aircraft, there are four new aircraft carriers and challenging situations to see if you can land on the decks. The aircraft and carriers are compatible with Combat Flight Simulator. For FS95 and FS98. \$39.95.



Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
800-451-4319
<http://www.abacuspublisher.com>



FS Clouds 98

Use FS Clouds to add new weather and scenery enhancements to FS98. The easy-to-use interface lets you select from 18 different types of clouds, adjust cloud layering and add new realistic ground textures which make flying even more authentic. Also includes new aircraft with panels: DC-8, Cessna 152, and Kitfox. For FS98. \$39.95

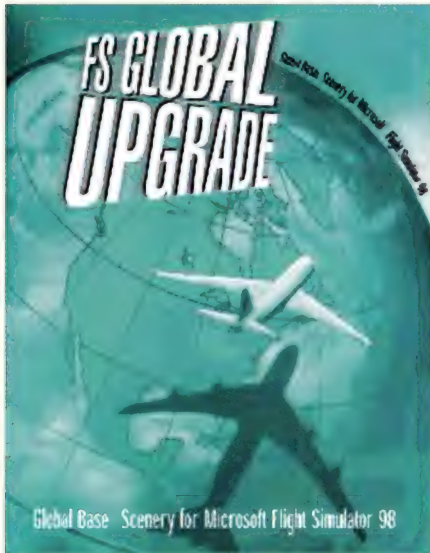
Flight One
PO Box 14692
Atlanta, GA 30324
404/231-1180
<http://www.flight1.com>



Full Throttle Christmas Shopper's Guide

FS Global Scenery Upgrade

This two CD-ROM set enhances the default scenery of MS Flight Simulator. The package was developed from actual digital data and includes all new ground textures, detailed coastlines, islands, cities, towns, highways, pipelines, railroads and more. Also includes extensive nav aids. Compatible with most third-party sceneries. For FS5.1, FS95 and FS98. \$49.95



Pilot's
Wiplingerstr. 24-26
A-1010 Vienna, Austria
+43-1-535-4010
<http://www.austrodata.at/GBS>

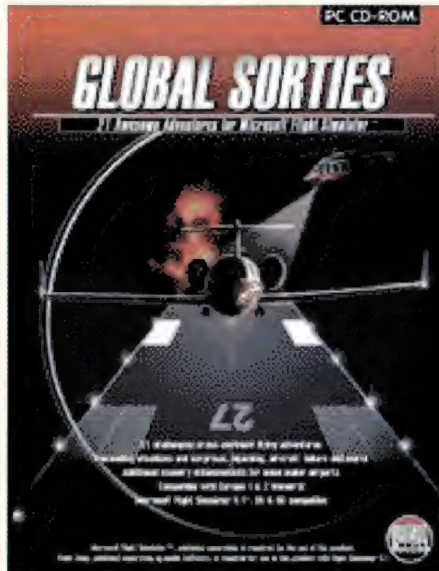
FSWow!

Clip-art for scenery designers! Use FSWow! TO Easily add 3D objects to your scenery. Select from a large database of ready-to-use objects and click to create a new scenery file that can contains dozens of new objects such as fuel trucks, control towers, radar dishes, buildings, static aircraft and more. For FS95 and FS98. \$49.00.

TekMate
15307 Parkville
Houston, TX 77068
281/440-5542
<http://rampages.onramp.net/~tekmate>

Global Sorties

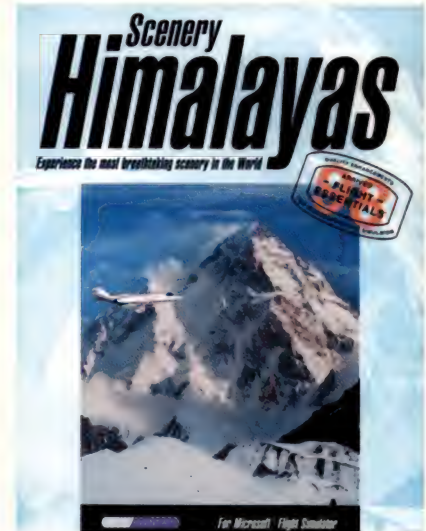
A set of twenty-one cross-continental adventures. Global Sorties uses with three different voices for communication as you're handed off to various ATC facilities. Weather conditions are variable with both day and night flights as you're asked to make it to your destination. For FS5.1, FS95 and FS98. \$29.95



Instant Access Software
The Technology Park
Colindeep Lane
London NW9 6DU, U.K.
+44-181-205-2596
<http://aerodrome.instantaccess.co.uk>

Himalayas Scenery

Lago says that Himalayas scenery is the largest ever, covering 2.5 million square kilometers of the most mountainous and treacherous areas in the world. Created from satellit imagery to 18 meters per pixel, it covers parts of Bhutan, Burma, China, India, Nepal and Pakistan and has 34 detailed airports, nav aids and charts. For FS95 and FS98. \$39.95.



Lago, SNC
Via Garibaldi 30
I-22100 Como, Italy
+39-31-241-444
<http://www.lagoonline.com>



HQ Aircraft Collection 98

Thirty-nine new aircraft and twenty new cockpits and a total of 199 new gauges makes up HQ Aircraft Collection. Includes Cessna 185, Commander 114, Piper Saratoga, Citation V, Dornier 328, MD82, Grumman Widgeon, DeHavilland Comet, Junkers Ju52 and more. For FS98. \$39.95

Technic Direct
Seestrasse, 31
A-6091 Neu-Gotzens, Austria
+43-5234-323-700
<http://www.td.co.at>



Instant Airplane Maker

These "next generation" aircraft are both visually superb and aerodynamically accurate. Includes fourteen different B747, DC-9, A319, A320 and A321 models and the unique capability to customize your own. With just four clicks you can customize these aircraft by selecting new color schemes, tail logos and your own "airline name". For FS98. \$39.95



Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
800-451-4319
<http://www.abacuspublisher.com>

Italy 98

Fly from the mountain areas of the Alps to the islands of Sardinia and Sicily as you cover more than 300,000 square kilometers. Scenery Italy has 130 airports, more than a hundred historical building and sites and all the nav aids, maps and approach charts you'll need for flying here. For FS95 and FS98. \$39.95.



Lago, snc
Via Garibaldi 30
I-22100 Como, Italy
+39-31-241-444
<http://www.lagoonline.com>

Jet Age

The Jet Age lets you fly the progressively famous series of aircraft that Boeing has made over the years: B707, B727, B737, B747 and B767. The different models of aircraft are dressed in a variety of liveries. Each aircraft has its own custom panels with working gauges and individual engine sounds. For FS98. \$39.95

AETI
3972 Barranca Pkwy, Suite J-501
Irvine, CA 92606
949/551-0372
<http://www.simpilot.com>

Pacific Northwest Scenery

This "mega" project is the latest in the Mega Scenery Series from PC Aviator, The Pacific NW is derived from 800 MB of satellite data to create photorealistic scenery encompassing 70,000 square miles of the Washington and Oregon and southern British Columbia area. The cities of Seattle, Portland and Vancouver are detailed in extra high resolution. For FS98. \$39.95



PC Aviator
219 Balaclava Rd
Suite 6
N. Caulfield, VIC 3161 Australia
+61-3-9532-8258
<http://www.pcaviator.co.au>

Pennsylvania/New Jersey Scenery

Justin Tyme, our noted Scenery Design columnist, recently completed a huge scenery called PANNJ98. The scenery includes accurate terrain modeling of Pennsylvania, New Jersey and lower New York. Justin has included more than 200 airports complete with nav aids. For FS95 and FS98. \$15.95



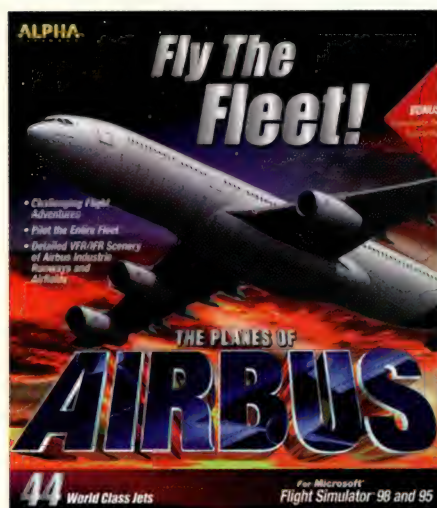
FS Genesis
604 Whittier Drive
Indiana, PA 15701
<http://www.fsgenesis.com>

Merry
Christmas

Full Throttle Christmas Shopper's Guide

Planes of Airbus

This huge collection is made from aircraft of the entire fleet from Airbus Industries. The 44 different aircraft are from the twelve Airbus models and include the A300, A300-600ST ("Beluga"), A310, A319, A320, A330, A340. Two bonus aircraft are also included – the supersonic Concorde. For FS95 and FS98. \$29.95



Alpha Software
168 Middlesex Turnpike
Burlington, MA 01803
781/229-2924

<http://www.alphasoftware.com>
and

Interactive Associates
Unit A2/A3 Edison Rd
St. Ives
Cambridgeshire PE17 4LF U.K.
+44-1-494-511-104
<http://www.theassociates.co.uk>

ProFlight 98

The main feature of ProFlight 98 is its very competent flight planner for creating voice ATC adventures between any set of airports. ProFlight's Flight Management Computer aids navigation chores and the Aircraft Personalization Wizards customizes aircraft. For FS98. \$49.00

AETI
3972 Barranca Pkwy, Suite J-501
Irvine, CA 92606
949/551-0372
<http://www.simpilot.com>



RAF Collection

More than thirty aircraft used by the Royal Air Force over the past sixty years. Also includes twelve new panels and an atlas of 200 RAF, Army and civilian airports in England and Wales with historical and technical info. RAF has been endorsed by the RAF Benevolent Fund. For FS95 and FS98.

24.99 GBP

Interactive Associates
Unit A2/A3 Edison Rd
St. Ives
Cambridgeshire PE17 4LF U.K.
+44-1-494-511-104
<http://www.theassociates.co.uk>

RealATC

Adds digital voice Air Traffic Control to FS98. Real ATC can generate sound for up to 20,000 flight combinations. A second part of this package is RealWeather FX which adds automatic weather changes as you fly thereby creating adventurous flights. For FS98. \$49.95



Papa Tango
15 Home Farm
Lutton Hoo Estate
Lutton Bedfordshire LU1 3RD U.K.
+44-1582-615-333
<http://www.papatango.com>

South America - Andes

The Andes stretch along the full length of South America and this scenery encompasses 1.3 millions square miles throughout Ecuador, Peru, Bolivia, Chile, Argentina and Antarctica. It includes all navigation aids as well as Jeppesen charts for the area. For FS5.1, FS95, FS98. \$39.00

Playsoft
Calle 74A, No 22-31
Bogota, Colombia
+57-1-540-4687
<http://www.playsoft.com.co>

Special Air Mission

Over the years, different Presidents of the United States have been ferried around the world in aircraft known as Air Force One Here are the "Presidential" aircraft that they have used 707-153 VC137-A(supply), 707-KC135-A/E (tanker), 707-E3-A (surveillance), 707 (retired Air Force One) and 747-200(current Air Force One). Includes photorealistic instrument panels For FS95 and FS98. \$29.95

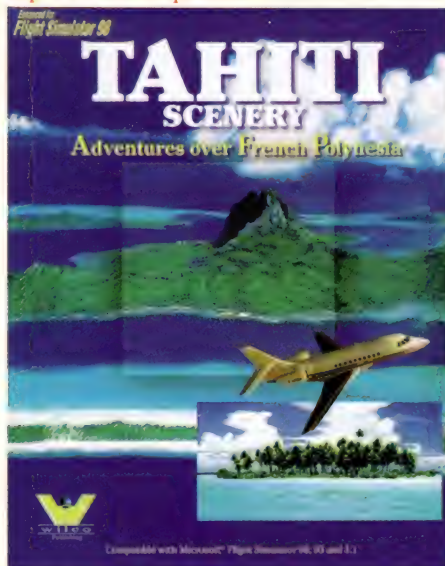
Data Becker, UK
Bentley Industrial Center, Unit 9
Bentley, Farnham
Surrey GU10 5NJ U.K.
+44-1420-22707
<http://www.databecker.co.uk>



Tahiti Scenery

Wilco subtitles this scenery "adventures over French Polynesia". You'll fly the beautiful paradise islands and cover more than 74,000 square miles in the South Pacific. Includes detailed vegetation, coral reefs, 3D objects, resolution of seven meters per pixel and complete airports, nav aids and charts. For FS5.1, FS95, FS98. \$42.00

Wilco Publishing
Chaussee de Ruisbroek 290
B-1620 Brogenbos, Belgium
+32-2-331-3290
<http://www.wilcopub.com>



Tribute to the DC-10

If you're a fan of the venerable DC-10, Flight Soft brings you twenty-four models in its "Tribute" package. All aircraft have new, advanced cockpits with working instruments and gauges, actual DC-10 sounds and digitized ATC communications. For FS98. \$34.95

Flight Soft
26 Common Street Suite 246
Belmont, MA 02478
<http://www.flightsoft.com>

VIP Classic Wings 98

A set of ten classic aircraft including the DC-3, Convair 240, 340, 440 and 580, Boeing 757, Lockheed Electra, P-3 Orion, DeHavilland DHC-1, Lockheed C-130, Shorts 360 and others. Each aircraft is presented in different models and are delivered with hi resolution panels with working instruments. For FS98. \$39.95.



PC Aviator
219 Balaclava Rd
Suite 6
N. Caulfield, VIC 3161 Australia
+61-3-9532-8258
<http://www.pcaviator.co.au>

VIP Classic Wings 98-Volume 2

This is the follow-on to their acclaimed VIP Classic Wings and has a new set of aircraft including the DC-4, North American T6 and SNJ, Avro Arrow and Lancaster, Bombardier Global Express, ATR 42 and 72, Airbus A310, Boeing 767, Boeing 747-400 and several others. As with the first volume, each aircraft is painted in different liveries and has all new custom panels with working instruments. For FS98. \$39.95.



VIP Group
3500 South Millway, Unit 52
Mississauga, ONT L5L 3T8 CANADA
<http://ourworld.compuserve.com/homepages/vipgroup/>



WinPlanner 4.0

An easy to use utility for making and printing flight plans. Database includes STARS, SIDS and aircraft performance data for realistic climb/descent times. Lets you add random or predefined weather conditions. The flight plans can be automatically converted into voice controlled adventures that can be used for ATC flight. For FS5.1, FS95 and FS98. \$49.95.

Lago, snc
Via Garibaldi 30
I-22100 Como, Italy
+39-31-241-444
<http://www.lagoononline.com>

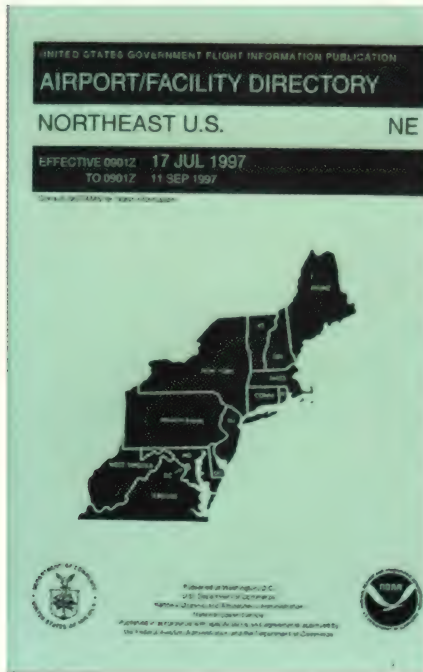


Full Throttle Christmas Shopper's Guide

Flight Sim Books/Magazines

Airport/Facility Directory

This series of references is published about five times a year and contains actual airport and facility information: runways, lengths, orientation, surface, communication frequencies, fuel availability, etc. For U.S. only, they are available for Northeast, Southeast, East Central, North Central, South Central, Northwest and Southwest. \$3.95 each.



National Ocean Service
N/ACC3, Distribution Division
Riverdale, MD 20737
(800) 638-8972
Fax: (301) 436-6829

Computer Pilot Magazine

An excellent source of current information, *Computer Pilot* is filled with lots of reviews and practical "how-to" articles. Publisher Robert Ferraro has assembled a quality team of flight sim experts to write what he calls "The Magazine for Desktop Pilots and Flight Simulator Enthusiasts." Bi-monthly.



Micro Pilot Publishing
Suite 6
219 Balacave Rd
N. Caulfield, VIC 3161 Australia
+ 61-3-9532-8258
<http://www.pcaviator.com.au>

Debrief Magazine

Debrief specializes in topics about combat simulations and strategy. According to Publisher Tom Basham, "...Our main emphasis is on training and tactics." *Debrief* covers aerial combat as well as ground and tank simulators, but the articles are of ample interest to flight simmers. Bi-monthly.



Debrief Magazine
Bear Zone Publications
10343 Federal
Unit J
Westminster, CO 80221
(303) 642-1456
<http://www.bearzone.com/debrief>

Merry Christmas

Flight Sim Maneuvers

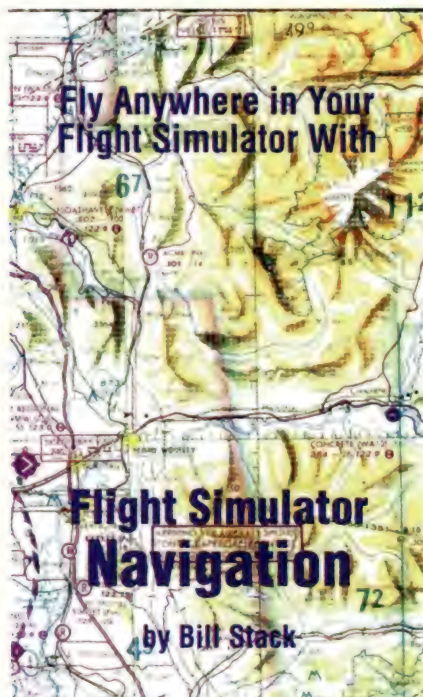
This manual shows the computer pilot the basics of flying: take off, climbing, turns and descent, flying straight and level, accelerating and decelerating at constant altitude, smooth landings with cross winds, slipping and crabbing. \$14.95



Training Associates
916 Wesley Road
Knoxville, TN 37909
(423) 584-7340
<http://www.topskills.com/flitsim.htm>

Flight Sim Navigation

Shows the flight simmer how to navigate: intro to the various methods and terms, reading and using aeronautical charts, planning and preparing your flight, flying cross country, wind compensation, flying the airways, using GPS. \$14.95



Training Associates
916 Wesley Road
Knoxville, TN 37909
(423) 584-7340
<http://www.topskills.com/flitsim.htm>

Flight Sim Pilot's Information Manual

Brings real-life aviation to the flight simmer by presenting the official regulations, procedures and standard practices for flying under VFR or IFR rules, using flight plans, flying your way out of simulated trouble with emergency procedures, aviation terminology and abbreviations. \$14.95



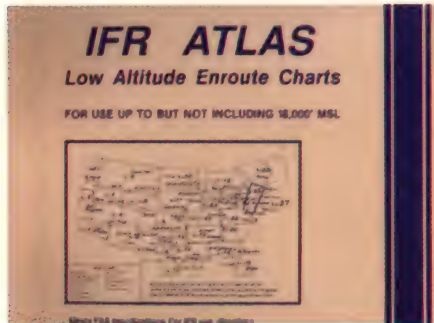
Training Associates
916 Wesley Road
Knoxville, TN 37909
(423) 584-7340
<http://www.topskills.com/flitsim.htm>



Full Throttle Christmas Shopper's Guide

IFR Atlas

The IFR Atlas contains aeronautical charts of the continental U.S. These charts depict the preferred routes with navigation aids and frequencies for flying IFR at low altitudes, something that the flight simmer does regularly. \$19.95

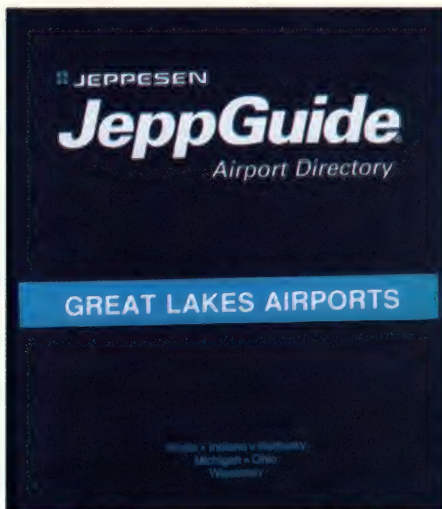


Desktop Wings
Box 422
Dublin, PA 18917
(215) 453-1405

<http://design-web.com/DesktopWings/index.htm>

JeppGuides

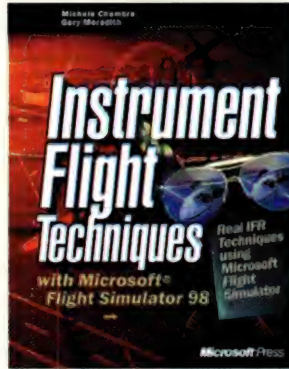
This series of references contains detailed airport and facilities information: airport diagrams, runways' lengths and surfaces, communication frequencies, fuel availability and repair services. Arranged by geographic area, worldwide coverage.



Jeppesen
55 Inverness Drive East
Englewood, CO 80112
(800) 621-5377
<http://www.jeppesen.com>

Instrument Flight Techniques

This book describes detailed instrument flying with MS FS98. Learn to fly under the hood making ILS approaches using the full repertoire of navigational instruments. \$19.99



Microsoft Press
Authors: Michele Chambre, Ben Chiu
ISBN 1572316284

Instrument Flying

This book shows you how to use flight simulators for instrument flight including flight rules and restrictions, proper user of the instruments, IFS flight planning, instrument approach charts, holding patterns and procedure turns, more. \$14.95

**Fly Anytime in Your
Flight Simulator With**



Instrument Flying For Flight-Simulation Pilots

by Bill Stack

Training Associates
916 Wesley Road
Knoxville, TN 37909
(423) 584-7340
<http://www.topskills.com/flitsim.htm>

Micro Simulateur Magazine

Written in French, this magazine is exciting and always current. MicroSim covers all aspects of gaming simulation, but the bulk of the magazine is aimed at flight simulation. Ass't Editor-in-Chief Remi Servat is well known in flight sim circles and is a helicopter fanatic so Micro Sim has good 'copter coverage. Monthly.



Mircro Simulateur
Espace Clichy
12, rue Mozart
F-92587 Clichy Cedex, France
+ 33-1-41-40-31-05
microsim@imaginet.fr



Microsoft Combat Flight Simulator: Inside Moves

The first book available for MS Combat Flight Simulator. You'll see how to fly the classic warplanes, perform aerial combat maneuvers, and return victorious from the missions. \$16.99



Microsoft Press
Author: Ben Chiu
ISBN 157231592X
<http://mspress.microsoft.com>

Microsoft Flight Simulator 98: Inside Moves

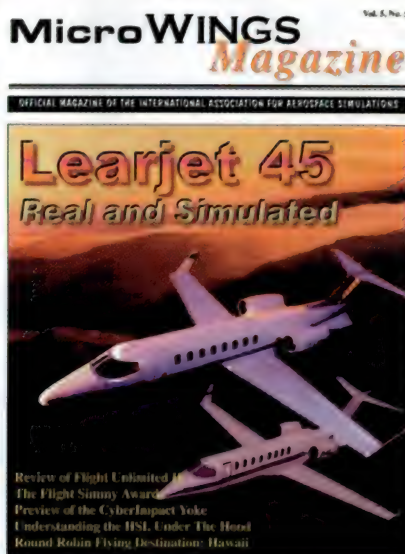
An introductory book to getting started using MS FS98. Learn the basics of flying, controlling the aircraft, using the instruments, navigation and keyboard commands. \$16.99



Microsoft Press
Authors: Ben Chiu, Gary Meredith
ISBN 1572316357
<http://mspress.microsoft.com>

MicroWings Magazine

Robert Mackay's MicroWings Association publishes the granddaddy of flight sim magazines, *MicroWings*. His team reviews flight sim software and presents how-to articles written by well-known and very competent writers. Bi-monthly



MicroWings
381 Casa Linda Plaza, #154
Dallas, TX 75218
(214) 324-1406
<http://www.microwings.com>

Navigation Tables

This handy reference book presents a simple-to-use method for navigating from one place to another using Flight Simulator. The tables include major cities throughout the Northern Hemisphere and specify the magnetic heading, distance and travel time between two points. \$39.99

C.F. Moore & Co. Ltd.
Denman Place Postal Outlet
PO Box 47035
Vancouver, BC V6G 3E1 Canada
(604) 687-2924
frank_moore@bc.sympatico.ca

Ultimate Flight Simulator Pilot's Guidebook

This is a bible of MS FS98. It describes the technical aspects of flying including navigation, scenery creation, aircraft mechanics, more. The included CD-ROM has maps, planners, new aircraft and customization tools. \$39.95 w/CD-ROM



IDG Press
Author: Nick Nargahi
ISBN 1558285741



Full Throttle Christmas Shopper's Guide

U.S. Terminal Procedures

This series of references is published about six times a year and contains instrument approach procedure, standard terminal arrivals, standard instrument departures and airport diagrams. For U.S. only, there are twenty different volumes arranged geographically. \$4.00 each.



National Ocean Service
N/ACC3, Distribution Division
Riverdale, MD 20737
(800) 638-89722
Fax: (301) 436-6829



Hardware

Control Yokes

CH Products Flightsim Yoke

This new product just announced at press time features a new control mechanism for smoother operation.



The USB version will include throttle, mixture and prop controls.

MSRP: to be announced

CH Products Virtual Pilot

Two fire buttons

Elevator and trim controls

Table mount by adjustable clamps

Seven-foot cable

Three-year warranty

MSRP: \$65.00



CH Products Virtual Pilot Pro

Two four-way switches

Six fire buttons

Elevator and trim controls

Table mount by adjustable clamps

Seven-foot cable

Three-year warranty

MSRP: \$79.00



Precision Flight Controls Cirrus Yoke

Powder-coated metal casing

Two-way rocker switches on each stem

Cessna-style throttle control

Real-world materials

Dimensions: W 14" H 5 1/4" D 12"

Weight: 20 lb.

MSRP: \$495.00



Quickshot Pro Wheel Control Yoke

Four fire buttons (A, B, C, D)

Two dual-speed turbo fire selectors

Rotary throttle control

Detachable accelerating pedal with eight-foot cable

MAX-throttle button

OFF-throttle button

Eight-foot cable with 15-pin game port connector

Four stabilizing suction cups

MSRP: \$49.99



Suncom G-Force Yoke

Four fire buttons

User can switch fire button settings from one handle to the other.

Lock the yoke and it converts to a steering wheel for racing simulation.

Dual mounting methods allow the G-Force Plus to be mounted to a table edge or via four super suction cups.

MSRP: \$39.99



Joysticks

CH Products F-16 Combatstick

Two four-way switches

Five fire buttons + trigger

Rotary throttle and trim controls

Weighted base

Seven-foot cable

Three-year warranty

MSRP: \$79.00



CH Products F-16 Fighterstick

One eight-way switch, three four-way switches

Three fire buttons

Trim control

Rotary throttle

Single-key macro programming

Compatible with all software that supports a keyboard and joystick

MSRP: \$99.00



CH Products F-16 Flightstick

Three fire buttons + trigger

Throttle control w/ third axis for engine speed

Trim control

Seven-foot cable

Three-year warranty

MSRP: \$36.00



CH Products CH Flightstick

Contoured grip

Throttle control

One fire button + trigger

Seven-foot cable

Three-year warranty

MSRP: \$25.00

CH Products CH Flightstick Pro

Three fire buttons + trigger

One four-way switch

Trim and throttle controls

Weighted base

Seven-foot cable

Three-year warranty

MSRP: \$59.00



CH Products Force FX

Six built-in force-feedback effects

Authentic F-16 grip

Two four-way switches, five fire buttons + trigger

Trim control

Provides 14 functions as a stand-alone stick.

Provides 34 functions when combined with Pro Throttle

Seven-foot cable

Six-month warranty

MSRP: \$100.00



CH Products CH Gamestick

Four push buttons

Slide-style throttle and trim controls

Windows95 software included

Ergonomic handle for both left and right hand use

Seven-foot cable

Three-year warranty

MSRP: \$29.00



CH Products Gamestick 14

Two base-mounted pushbuttons

Two faceplate pushbuttons

Two directional pads

Slide throttle and trim controls

One four-way switch + trigger

Under-trigger button

Windows95 programming software included

Seven-foot cable

Three-year warranty

MSRP: \$63.00



CH Products Janes Combat Stick

Authentic F-16 Grip

Two four-way switches, five fire buttons + trigger

Rotary trim and throttle

Total of 14 functions

Total of 34 functions when combined with Pro Throttle

Seven-foot cable

Three-year warranty

MSRP: \$89.00



CH Products CH Jetstick

Contoured grip

One fire button + trigger

Seven-foot cable

Three-year warranty

MSRP: \$15.00



Gravis Blackhawk

Four fire buttons

Rotary throttle

Molded pistol grip

Integrated hand rest

Weighted base

MSRP: \$34.95



Gravis Blackhawk Digital

13 programmable functions

100% digital technology

Keyset Manager™ software

Rotary throttle

Eight-way point-of-view hat switch

Built-in two-player connector for head-to-head combat

Molded grip with hand rest

Three-year warranty

MSRP: not available at press time



Gravis Firebird 2

13 programmable buttons

Eight-way programmable hat switch

Assigns macro codes with up to 106 keystrokes to a single button

T-grip rotary throttle and elevator trim adjuster

Contoured pistol grip with hand rest

Adjustable handle tension

Weighted base

MSRP: \$89.95



Gravis PC Pro Joystick™

Throttle control

Four fire buttons + trigger

Eight adjustable handle tension settings

Unique "throttle off" feature

Six-foot cable

Foam padded handle

MSRP: \$24.95



Full Throttle Christmas Shopper's Guide

Gravis Thunderbird

Four fire buttons + trigger
Four-way CH-compatible hat switch
T-grip rotary throttle and elevator trim control
Contoured handle with comfortable hand rest
Handle tension adjusts independently in four directions
MSRP: \$59.95



Logitech WingMan

Custom handle design
Throttle control
Steel-weighted base
Realistic rubber buttons
Seven-foot cable
One year warranty
MSRP: Not available at press time



Logitech WingMan Extreme Digital

100% digital technology
Programmability without using the keyboard
Sculptured grip
Reinforced trigger and hat switch stand
Six rubber-coated buttons
Weighted base
Radial throttle system
MSRP: Not available at press time



Logitech WingMan Force

Force Feedback capability
Nine programmable buttons
Eight-way hat switch and throttle wheel
Custom grip
USB and serial interface.
One year warranty
MSRP: Not available at press time



Logitech WingMan Interceptor

Custom handle grip
Net-2 magnetic encoding technology
Wingman® Profiler™ software
33 programmable switches
Precision radial throttle
High-precision radial throttle
Three Eight-way hat switches
Nine rubberized programmable buttons
Rapid-fire trigger with two-way switch
MSRP: Not available at press time

Logitech WingMan Warrior

Two-handed control design
SpinControl™ knob offering 360-degree SpinControl
Four-way view hat switch
Quick-action trigger and rubber-encased buttons
Throttle control
Weighted base
MSRP: Not available at press time



Microsoft SideWinder

Tactile switches
Trigger
MSRP: \$34.95



Microsoft SideWinder 3D Pro

Programmable controls
Software with preset profiles for many games
MSRP: Not available at press time



Microsoft SideWinder Force Feedback

16-bit on-stick processor
Force feedback technology
SideWinder Force Feedback Pro works only with Windows 95-compatible games
MSRP: \$139.00



Quickshot 3D Striker

Rotational 3-D handle
Multi-view hat switch and six fire/action buttons
Full digital control
39 function keys
Custom grip design and foam wrist support
Weighted base
Reference settings/templates for popular games
No programming required
Connects to PC/AT or PS/2 keyboard ports
MSRP: \$49.99



Quickshot GenX 500

Right-handed 3-D handle
Four fire buttons
Rudder (rotational movement)
Multi-view hat switch
Throttle control
Metal weighted base
Cool, dark, metallic blue color
Seven-foot cable
Three-year warranty
MSRP: \$34.99



Quickshot GenX 500L

Left-handed 3-D handle
Four fire buttons
Rudder (rotational movement)
Multi-view hat switch
Throttle control
Metal weighted base
Cool, dark, metallic blue color
Seven-foot cable
Three-year warranty
MSRP (USA): \$34.99



Quickshot GenX 700K

Right-handed 3-D handle
Four handle fire buttons
Four keyboard digital buttons
Rudder (rotational movement)
Multi-view hat switch
Full-size BioThrottle



Control mode selectors for hat, rudder and full-digital mode

Metal weighted base

Seven-foot cable

Keyboard port bypass

Three-year warranty

MSRP: \$49.99

Quickshot Interceptor

Omni-directional grip
Built-in micro switches
Automatic control stick centering



Four positive-response fire buttons

Dual-speed turbo fire selection (A & B buttons)

Pop-up fire button cover

Throttle control

Six-foot cable

MSRP: \$34.99

Quickshot Skymaster

Four fire buttons
Throttle control
Four-way hat switch
X-/Y-axis adjustment controls
Eight-foot cable
MSRP: \$24.99



Quickshot Sky Commander

Adjustable joystick and throttle separation
10 programmable fire buttons
Programmable HAT for flight simulation games



Joystick programming software for Windows 3.1 and Windows 95

Weapons select system

HAT and throttle can be programmed to function as joystick or keyboard

LED program indicator

Non-volatile memory for storing game settings

Supports both PS/2 and AT keyboards

Weighted base

Eight-foot joystick cable

Eight-foot keyboard cable

MSRP: \$79.95

Quickshot Strato Warrior

Auto-centering

Four fire buttons (A, B, C, D)

X-/Y-axis adjustment control

Rotary throttle control

Detachable accelerating pedal with eight-foot cable

Seven-foot cable

Weighted base

MSRP: \$24.99



Saitek Cyborg 3D

Fully hand adjustable for right and left handers

3-D twist function

Ratio digital technology

Up to 24 programmable actions

USB version available

A total of 16 independent programmable buttons

MSRP: \$69.95



Saitek X35F Flightstick

Four Fire buttons

"Pinkie" switch (can double function of other controls)

Two eight-way hat switches

CH Combat Stick compatible in default mode

MSRP: \$69.95



Saitek X36F Flightstick

Fully programmable

High grip finish

Four fire buttons

"Pinkie" switch (can double function of other controls)

Two eight-way hat switches

MSRP: \$149.95



Suncom F15 Talon

Tactical control sticks

Authentic replica of the pilot's hand-control grip in the USAF's premier tactical fighter: the F-15E Strike Eagle

MSRP: \$49.99



Suncom FX 1000 Joystick

Contoured grip

Four-button analog joystick.

Large suction cups for stability

X and Y axis trimmers

MSRP: \$14.99

<!insert-SunFX1000!>

Suncom Scepter LCD

Touch 'N Go programming, no software to install

24 programmable buttons

Stores and remembers up to 480 game commands

Digital / optical technology

LCD readout of programmed functions

Ergonomic grip

Scepter LCD fully featured controller

MSRP: \$ 79.99



Full Throttle Christmas Shopper's Guide

Thrustmaster F22 Pro

Dual-stage trigger
Heavy-gauge spring tension
Glass-filled ABS handle
Powder-coated metal base
Four programmable buttons
Four four-way switches
Geared potentiometers
Metal gimbal mechanism
Programmable in both digital and analog
Auto download
MSRP: \$149.95



Thrustmaster Millennium 3D

Non-contact optical sensors
Completely digital for speed and precision
Six programmable buttons
Programmable four-way hat switch
Ergonomic two-hand control design
Includes pre-configured files for many popular games
MSRP: \$29.95



Thrustmaster Top Gun®

Four-way hat switch
Three beveled buttons
Weighted base
Neoprene grip
Low-resistance boot
Fully programmable when used with ThrustMaster's Attack Throttle™
Easy installation
MSRP: \$29.95



Thrustmaster Top Gun® Platinum™

Four buttons, point-of-view hat and throttle
CD with Windows™ 95/98 drivers included
Military handle design
Software allows throttle to be used as rudder input
Officially licensed TOP GUN® joystick
MSRP: \$39.95



Rudder Pedals

CH Products CH Pedals

Dual mode for aircraft/car
Seven-foot cable
Weighted base
Three-year warranty
MSRP: \$55.00



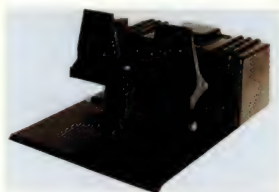
CH Products CH Pro Pedals

Dual mode for aircraft/car
Sliding motion for pedals
Wide pedal spacing
Seven-foot cable
Weighted base
Three-year warranty
MSRP: \$89.00



ControlVision SimHawk Rudder Pedals

Duplicates motion of real-world rudder pedals
Toe brakes
Powder-coated steel and aluminum base
For connection to SimHawk control unit only
MSRP: \$300.00



Precision Flight Controls Cirrus Pedals

Duplicates motion of real-world rudder pedals
Toe brakes
Powder-coated aluminum base
MSRP: \$395.00



Thrustmaster Elite Rudder Pedals

True fore and aft movement of pedals
Spring loaded pivot action
Extra-large weighted base
Wide pedal configuration
Full one-year warranty
MSRP: \$79.95



Throttles

CH Products CH Pro Throttle

Four four-way switches and pushbuttons
Sliding action
Left-handed grip
Both analog and digital modes
Single-key macro programming stores 400 macro characters
Compatible with all software that supports a keyboard and joystick.
Includes AT and PS/2 keyboard connectors.
Added programmability for joystick functions
Three-year warranty
MSRP: \$99.00



Saitek X35T Throttle

Rudder control (analog or digital)
Mouse control plus selector button
Second three-position digital switch
Second fire button
Two rotary controls
Controls available & programmable used with Saitek X36F control stick
MSRP: not available at press time



Saitek X36T Throttle

Four detent positions
Rudder control (analog or digital)
Mouse control plus selector button
Three-position mode switch



Controls available & programmable used with Saitek X36F control stick

MSRP: not available at press time

Suncom SFS Split Throttle

Touch 'N Go programming—no software needed

16 programmable buttons

Program one to five keystrokes, including macros or chord keys



Programmable with any joystick

Multiple hat switches and military-style grips

MSRP: \$99.99

Thrustmaster Attack Throttle

Military-style design

Includes programming software

Connects with any joystick and rudders, including analog

100% digital design

PC gameport compatible

MSRP: \$69.95



Thrustmaster F16 TQS Throttle

Replica of real F-16 throttle

Targeting cursor control

Military-style design

Two dials

Two three-position switches

Four-way radio switch

Arched throttle movement

Afterburner & idle detents

Completely user programmable

MSRP: \$109.95



Flight Consoles

ControlVision Simhawk Panel Unit

Yoke designed like real-world flight yoke

Throttle / mixture control / prop control

Mag switch / master switch

Trim wheel / four-position flap switch / landing gear switch / nav lights / beacon

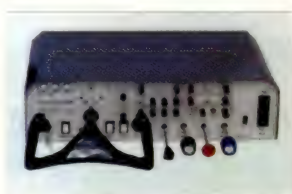
Intercom / audio volume control

Controls for all radios, VORs, ADF and AP heading and altitude

Simulation controls for viewport restart and pause

Compatible with Microsoft Flight Simulator v. 5.1 and later

MSRP: \$1,295.00



Precision Flight Controls PAL Panel

Connects through keyboard via "Y" interface

Utilizes high-resolution overlays for MS Flight Simulator 98 and many other combat games

MSRP: \$149.95



Quickshot Master Pilot 98 Console

Connect multiple units in a series

Weighted metal stand allows two different operating angles (either 25° or 77°)

Includes a custom game card for each game with its specific commands

77 games are pre-programmed on an upgradeable cartridge



Comes with both PS/2 (mini-DIN) & standard five-pin DIN keyboard connectors

Launch Windows 95 utilities (game card for WIN 95 included)

MSRP: \$59.99

Quickshot Master Pilot Programmer

An accessory for the MasterPilot flight console

Allows you to program the game setting cartridge with any preferred key sequence.

MSRP: \$29.99



Saitek PCDASH Panel Control Device

PC-compatible

Two fire buttons

Fully programmable (Over 150 functions)

Eight-way thumb pad

Three function buttons with status LEDs

Can be used in conjunction with joysticks or other controllers.

MSRP: \$69.95



Accessories

CH Products CH Gamecard 3 Automatic

Automatically adjusts to your computer's speed from 4.77 MHz up to 300+ MHz for maximum performance

Two joystick ports

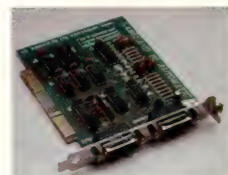
Automatically adjusts speed with up to 32 possible values

Can be manually set

Software included

One-year warranty

MSRP: \$29.00



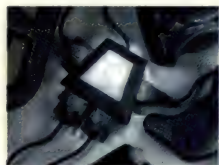
Full Throttle Christmas Shopper's Guide

Manufacturer Information

CH Products Joystick Switchbox

Allows simultaneous connection of up to four control devices

MSRP: \$25.00



CH Products

Phone: (760) 598-2518

Web site: www.chproducts.com

E-mail: sales@chproducts.com

Fax: (408) 263-4005

Web site: www.quickshot.com

E-mail: sales@qticom.isp.net

Rock 'n Ride

Phone: (760)-244-1893

Web site: www.rocknride.com

E-mail: rocknride@hotmail.com

CH Products X and Y Cable Extensions

MSRP: \$12.00



ControlVision Corp.

Box 596

Pittsburg, KS 66762

Phone: (800) 292-1160; (316) 231-6647

Fax: (316) 231-5816

Web site: www.controlvision.com

E-mail: sales@controlvision.com

Saitek Industries

2295 Jefferson Street

Torrance, CA 90501

Phone: (310) 212-5412

Fax: (310) 212-0866

Web site: www.saitekusa.com

E-mail: support@saitekusa.com

Rock'nRide

Moves you and your monitor up to 55 degrees in response to input from the joystick control

MSRP: \$599.00 (additional accessories may be required)



Gravis

2855 Campus Drive

San Mateo, CA 94403

Phone: (650) 572-2700

Web site: www.gravis.com

E-mail: webmaster@gravis.com

Suncom

Web site: www.suncom.com

E-mail: sales@suncominc.com

ThrustMaster, Inc.

7175 NW Evergreen Pkwy, #400

Hillsboro, OR 97124

Phone: (503) 615-3200

Fax: (503) 615-3300

Web site: www.thrustmaster.com

E-mail: info@thrustmaster.com

Logitech, Inc.

6505 Kaiser Dr.

Fremont, CA 94555

Phone: (800) 231-7717

Web site: www.logitech.com

Microsoft Corp.

Web site: www.microsoft.com

Precision Flight Controls, Inc.

11500 Sunrise Gold Circle, Suite D

Rancho Cordova, CA 95742

Phone: (916) 638-1310

Fax: (916) 638-1426

Web site: www.flypfc.com

E-mail: info@flypfc.com

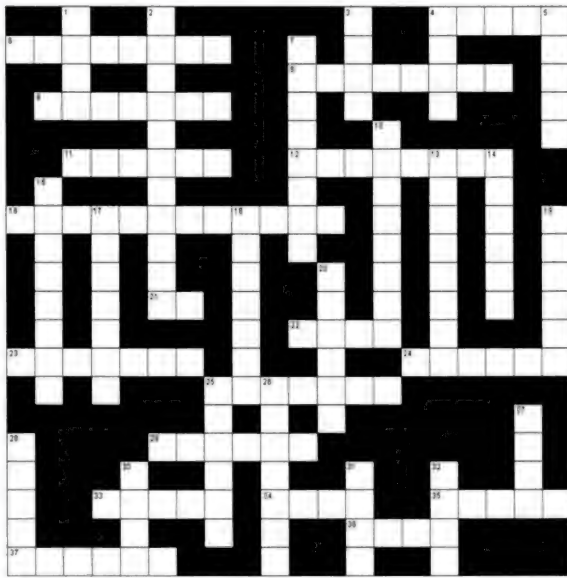
QuickShot Technology, Inc.

950 Yosemite Drive

Milpitas, CA 95035

Tel: (408) 263-4163

Crosswinds



Across

4. _____craft Baron B-55, _____craft XA-38.
6. Amelia Earhart's plane; _____ Electra L10.
8. _____ (seversky) AT-12 Guardsman.
9. _____ XA-41; only one prototype completed.
11. _____ 747-300.
12. _____ R-4/R-6 Hoverfly; _____ R-5 Dragonfly; helicopter
16. _____ PBY Catalina
21. _____ 10, _____ 9, _____ 3; Washinton _____
22. Microsoft Flight Simulator 98's _____ jet 45.
23. _____ SB2C Helldiver, _____ P-40 Warhawk.
24. Microsoft Flight Simulator 98's _____ 182RG
25. E2C _____; Capt. Pierce nickname from M.A.S.H.
29. _____ B-26 Marauder, _____ B-10/B-12.
33. Phonetic alphabet for the letter 'J'.
34. Phonetic alphabet for the letter 'K'.
35. Phonetic alphabet for the letter 'R'.
36. Phonetic alphabet for the letter 'L'.
37. _____ 320, _____ 319.

Down

1. Phonetic alphabet for the letter 'E'.
2. _____ Mosquito/F-8, _____ Vampire T-11.
3. Phonetic alphabet for the letter 'P'.
4. Microsoft Flight Simulaoptr 98 's _____ Jetranger helicopter.
5. Phonetic alphabet for the letter 'H'.
7. _____ F2A Buffalo, _____ SB2A Buccaneer
10. Phonetic alphabet for the letter 'N'.
13. Supermarine _____ MK1
14. Phonetic alphabet for the letter 'Y'.
15. _____ T-38 talon
17. Microsoft Flight Simulator 98's _____ Camel
18. _____ L-3 Grasshopper, _____ LB.
19. Phonetic alphabet for the letter 'S'.
20. Phonetic alphabet for the letter 'Q'.
25. F/A-18A _____
26. Phonetic alphabet for the letter 'W'.
27. Phonetic alphabet for the letter 'M'.
28. Phonetic alphabet for the letter 'A'.
30. Phonetic alphabet for the letter 'Z'.
31. Phonetic alphabet for the letter 'G'.
32. Phonetic alphabet for the letter 'X'.

Welcome to Crosswinds! This puzzle contains names of planes and parts of the phonetic alphabet. This one is on the easier level so have fun! If you cannot figure one out, see the bottom of the page for the answers.

CROSSWINDS

CROSSWINDS



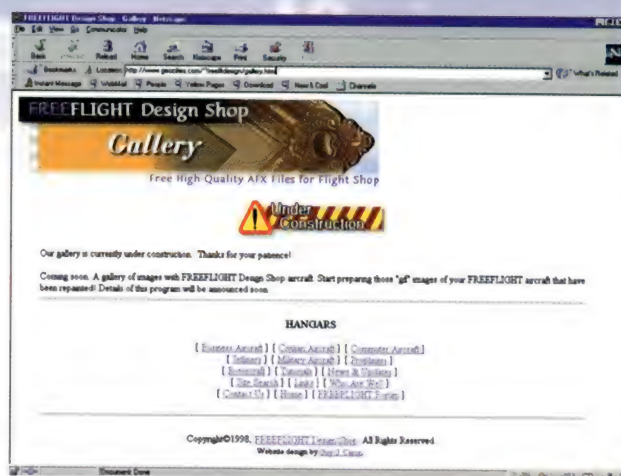
Web Watch

Internet Sites for Simmers

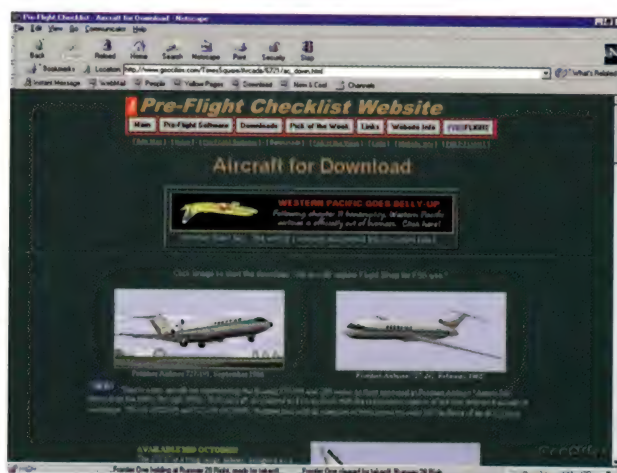
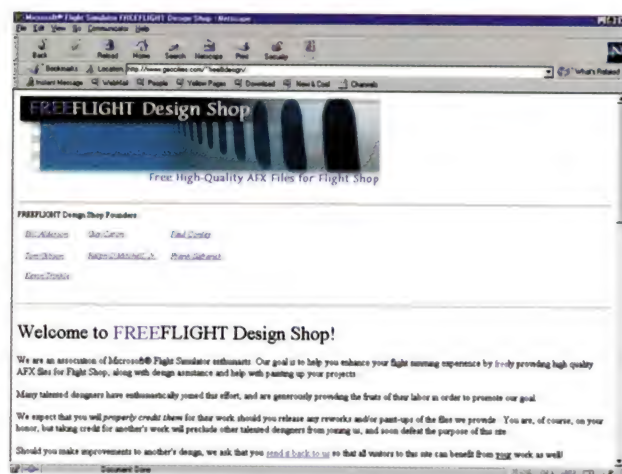
by Adam Howe

Welcome, passengers, to your flight around the World Wide Web! As you take your seats, the stewardess will go through the safety instructions for our flight and point out the monitor in front of you for our journey. Today we will visit some great freeware sites and download areas, as well as an on-line magazine and Sean D. Tucker's Website.

Our first stop on our world-wide journey brings us to <http://www.geocities.com/~freeflightdesign> for a look at some freeware .AFX files for the Flight Shop program. This site is nicely arranged and easy to follow. The .AFX files are arranged by type of aircraft: Business Aircraft, Civilian Aircraft, Commuter Aircraft Jetliners, Military Aircraft, Propliners and Rotocraft. These files are free to download and modify at your will, as long as you are courteous and give credit to the authors who poured their hearts and souls into these files. Even though I am not much of an aircraft designer, it is nice to know these files are available if I ever decide to give it a go!



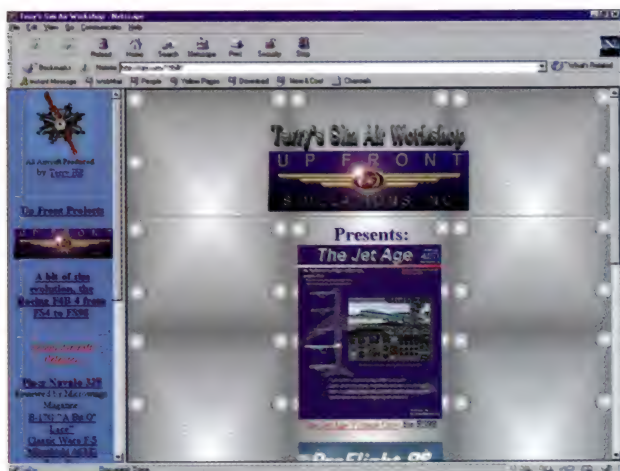
Now we set our browser to <http://www.geocities.com/TimesSquare/Arcade/6721/index.html> for a look at the Preflight Checklist Website. This site offers a good selection of downloads geared toward the larger jets. You can also find a good links page, some aircraft pictures and some pre-flight software.



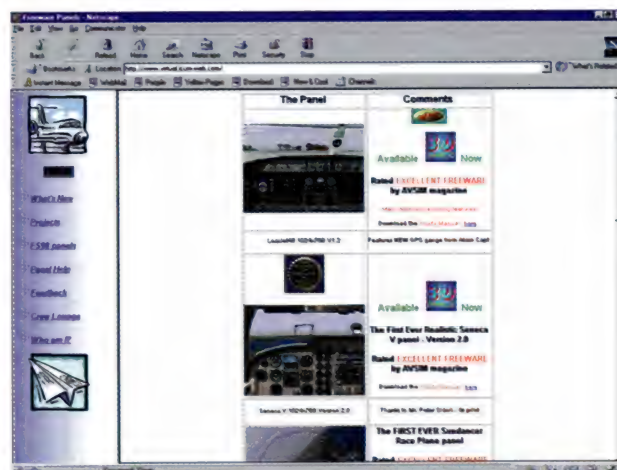
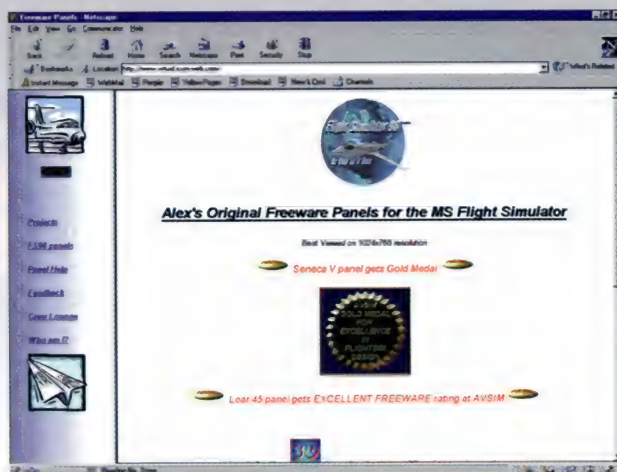
Web Watch



One of the best aircraft designers in the world, Terry Hill, can be found hosting his own Website at <http://qni.com/~tlhill/>. In my time spent looking for aircraft on the Internet, I have often found myself downloading planes by Terry Hill to add to my personal collection in FS. This site offers his planes for downloading and even has some information on other Flight Simulator add-on packages. This site is definitely worth a visit.



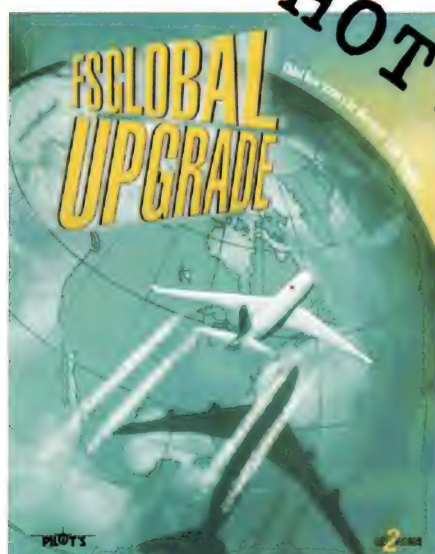
Browsing to <http://www.virtual.icom-web.com/> brings us to a site dedicated to freeware panels. This site contains a lot of panels to add to your FS98 planes to make the simming experience even more authentic. I even found myself bringing a few of these panels into my Flight Simulator.



As we all know, *Full Throttle* is a great flight sim magazine (if I do say so myself). For those of you who are looking for a good on-line aviation magazine, check out <http://www.avweb.com>. This on-line magazine has all kinds of features, including Brainteasers, Reviews, Databases, Aviation Law and many more. If you are a pilot or are thinking of becoming a pilot, please do yourself a favor and visit the *AVweb* magazine site.



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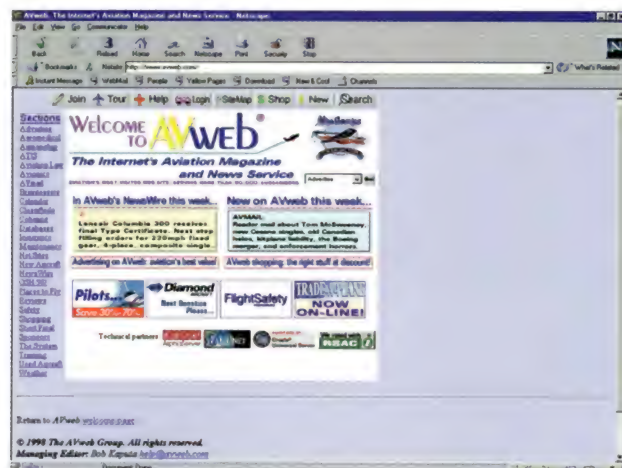
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- highways, roads, tracks and trails with appropriate night effects
- above ground pipelines
- detailed vegetation data
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latest news stop works with microsoft fs5.1 fs95 fs98 and Combat Simulator stop



Everyone who was intrigued by the interview with Sean D. Tucker (see page 28) will want to check out his Website at <http://www.poweraerobatics.com>. Check out the Power Aerobatics Team's adventures and meet the team members. Be sure to sign the guestbook and see their television appearance on Baywatch!



Thank you for accompanying me and *Full Throttle* magazine on our little journey around the World Wide Web. If you have any questions or comments on this article or if you would like to suggest a Website to be mentioned here (or even if you would like to "plug" your own), please drop me a line at adam@ftmagazine.com.

CoPilot v. 2.0

Review by Phil Paschutine

The first and most important phase of any flight is careful planning. You plan the route, obtain weather information and study the Instrument Approach Procedure(s) (IAP). Then you store the necessary charts for the flight in your trusty folder and off you go to the airport (which is virtual, in our case).

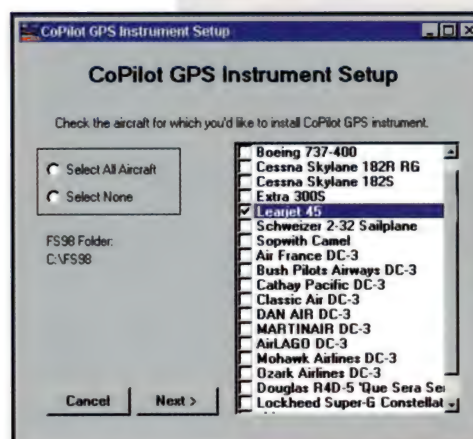
If you have the appropriate navigation charts, flight planning should not be a problem. However, many flight simmers do not possess the full set of DOD/Jepp IAPs and high/low enroute charts for any one country, as they can be pretty expensive. In Europe, cost varies from \$8 to \$15 for a single enroute chart, and IAPs are outrageously expensive.

Flight Simulator's runway information can be wrong, particularly if the designer used real-world magdec data instead of Flight Simulator magdec. Nav aids may be misplaced or decommissioned. Your best bet is to use the data that is contained in the FS .BGL files. At least you know they are accurate *in the FS world*, so, not having any airport charts, enroute or IAPs is no longer a limiting factor. Abacus's **CoPilot** will read the .BGLs and display the airports, nav aids, fixes, transportation and hydrographic data on a map. You can then visually plan your flight, print the needed airport chart(s) and IAP(s), and take off.

Installation

As always, installing Abacus software is as easy as two mouse clicks. When the InstallShield is finished, you may install the GPS for either FS 95 or FS 98. The FS 95 GPS is the same one as in CoPilot v1.1. It requires FS6IPC.DLL to act as link between Flight Simulator and CoPilot. (Adam Szofran's FS6IPC.DLL allows many other applications to access the simulator's data while Flight Simulator is running.)

The FS 98 handheld GPS is a resizable gauge that also works in full-screen 3DFX. You can also install it in all your aircraft or do a selective install.



Aircraft designers will be happy to know that they can include the CoPilot GPS gauge in an instrument panel, just like any other FS 98 gauge. For more information, read the well-written tutorial on designing panels at the Full Throttle Web site : <http://www.ftmagazine.com>.

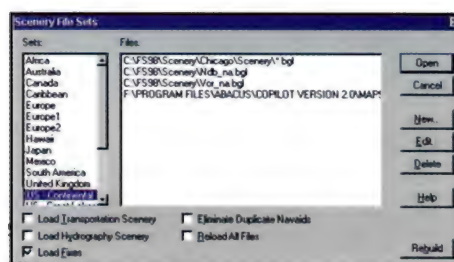
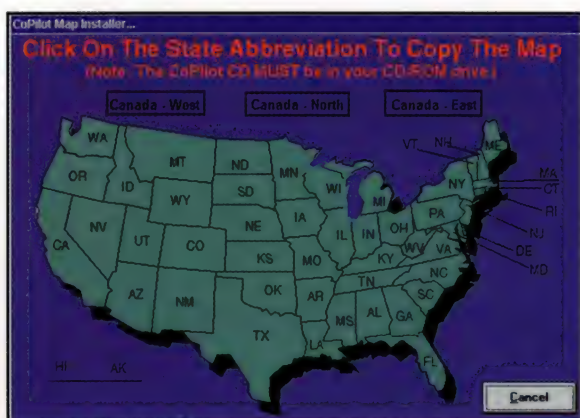
Manual and Maps

The 95-page manual is well written and will guide you through installation, set up and use of CoPilot v2.0 and its many features (which include multi-window flight planning, use of fixes, route options, GPS options, etc.).

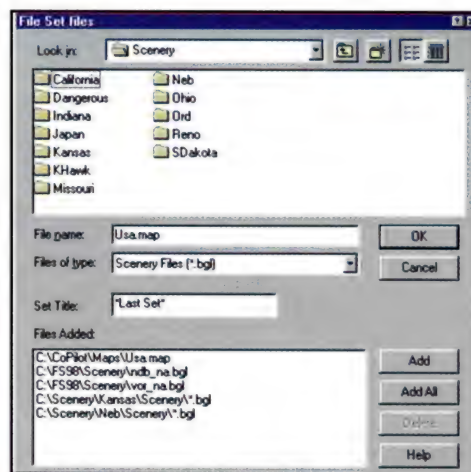
67 maps for the US, Canada and other countries are included on the CD-ROM. During the initial CoPilot install, foreign country maps are copied to the CoPilot/Maps folder. If you wish to install a specific US/Canada state map, use the map installer program.

CoPilot was created by Peter Jacobson. It's distributed by Abacus (www.abacuspublisher.com). Full Throttle's publisher Arnie Lee is also CEO of Abacus. Phil Paschutine is an independent author.





They can be rebuilt anytime you add a new scenery add-on. New add-on scenery files can be located by selecting **File | Open Scenery Files** and clicking the **New** button.



The Program

Creating Scenery Sets/Displaying and Loading .BGL Data

The first time you use CoPilot, it reads your FS scenery directories and builds scenery sets that include all necessary .BGL files and maps (i.e., Europe1, Europe2, Italy, etc.). Others are default sets that use the booster scenery files. If the booster files are not found on the hard drive, these sets will only include the map. If this is the case, just edit the scenery sets to include the appropriate booster file paths.

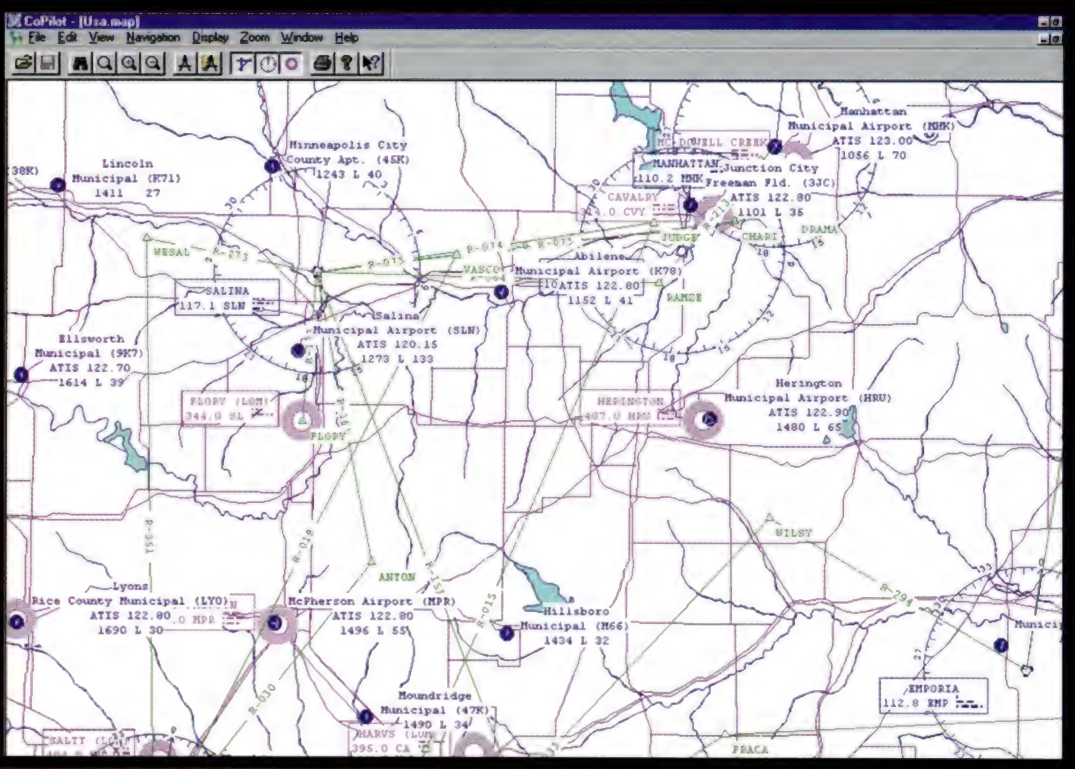
Scenery sets can, of course, be edited, created from scratch or, as in this case, scenery can be located elsewhere.

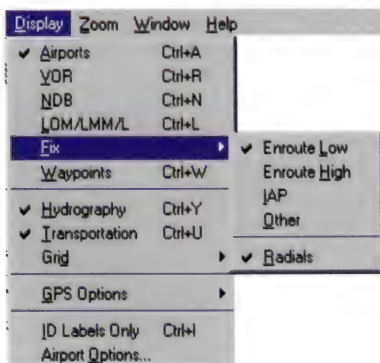
A new feature of CoPilot 2.0 is the ability to display transportation and hydrographic data. This may prove useful when flying VFR. CoPilot will read the .BGLs of the scenery you have chosen, load a map and display airports, navids (VOR, NDB, LOM, LMM, L), fixes (US only),

and hydrographic/transportation data. It eliminates duplicate navids, assigns the IDs and lets you choose a map projection and resolution, as well as elevation and distance units (see image to the left). These map options can be defined in the **Preferences** menu, unless you wish to define them each time you load a scenery set.

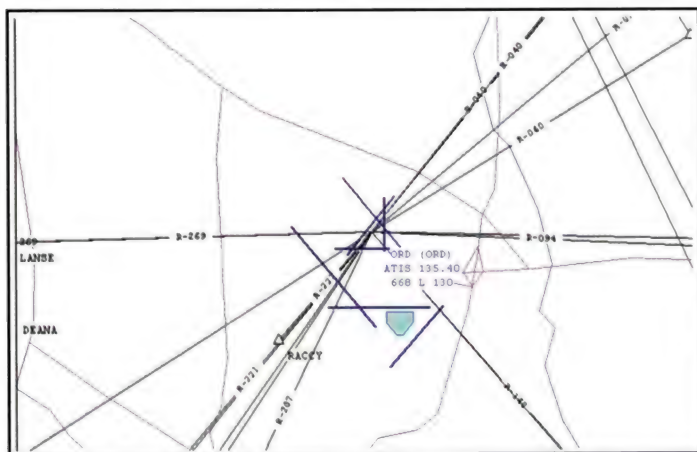
Fixes

Being an IFR devotee, this is an essential feature in my opinion—no more guessing where those fixes are. flight Deck's IFT-PRO 6.1 and other high-end simulators have fix/intersection databases and it was about time we had fixes for Flight Simulator!





You can display the High and Low enroute fixes. When approaching an airport, you can display the IAP fixes. If this is not enough, you can display VOR radials. Other fixes are the IAF type.



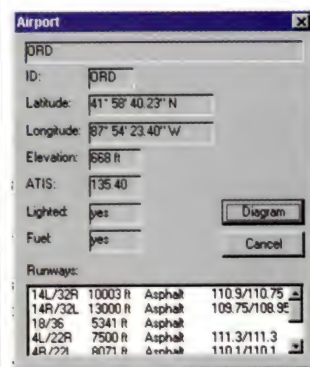
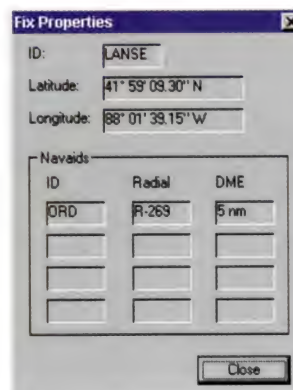
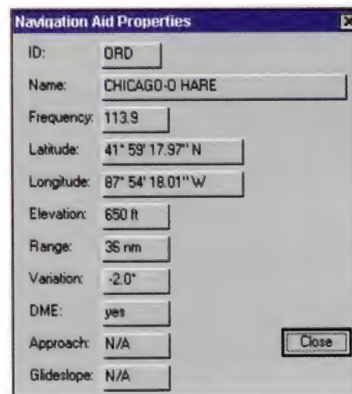
With 15,281 fixes for the USA and many radials and nav aids, the map will soon become cluttered with too much data unless you modify the labels' display scale and define which map elements are to be displayed on startup. I advise you to display the low-altitude radials at a scale of 1:1,400,000, and 1:200,000 to 1:100,000 if you add IAP fixes. While fixes are subjects to modification, I found that CoPilot's fix database was up to date. Regrettably, no fixes are available for the rest of the world. Hopefully, Abacus will address this problem.

If you are in a hurry and have access to the Internet, you can download user-made fix files at <http://www.flightsim.com>. If not, you can add your own fixes in the FIXES.TXT file. The format is:

FIX_NAME, XX.XXXXXX, -XXX.XXXXXX, 0 ,,,,,,

is either for W or S.

Pop-up menus will display nav aid, FIX and airport info.



Nav aid information is available through the property pop-up in either map mode or airport chart mode. You can find information for any object in the **Edit | Find** menu.

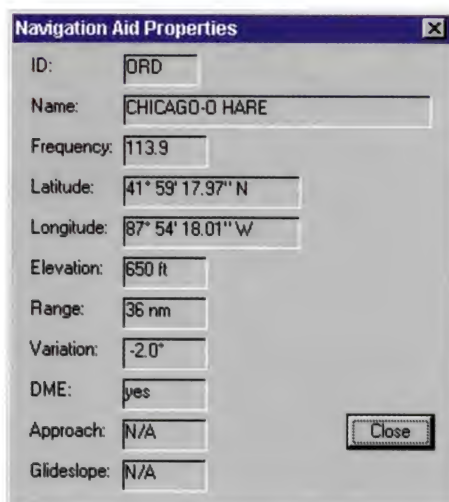
Airport Data-Map Mode

In map mode, you can left-click on an airport icon to access its information box. This data includes coordinates, elevation, ATIS frequency, and if available, lighting/fuel and the runways for the airport (type, length and available ILS frequencies). You can access the more detailed airport chart by selecting *Diagram*.

Airport Data-Chart Mode

The airport chart displays all runways, taxiways, building locations, lighting, nav aids and ILS locations. In airport chart mode, you can get information on a nav aid or a runway with a click of the mouse.





Navigation Aid Properties

ID:

Name:

Frequency:

Latitude:

Longitude:

Elevation:

Range:

Variation:

DME:

Approach:

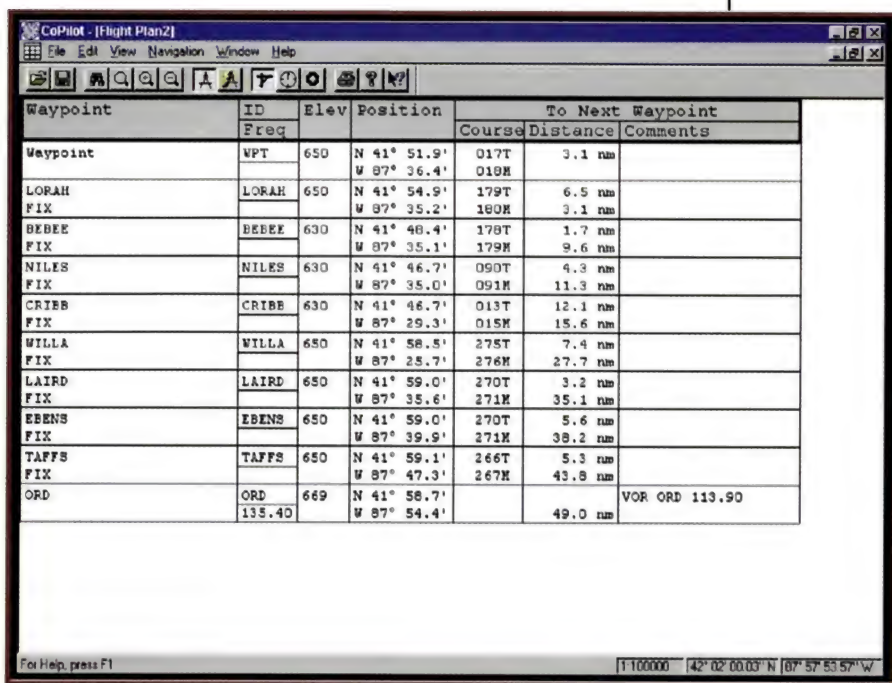
Glideslope:

In the information window, clicking on the ILS button will bring its IAP (also accessible through the Approach Plate option of the pop up).

In a CoPilot-generated IAP, the final approach course can differ by 1°-2° compared to the one published in a real IAP. This is because Flight Simulator's magdec data has no yearly variation. The agonic lines and magnetic variation are not the same as in the real world, and some designers do not use FS Magdec data when adjusting their runways! So, using a real IAP can in some occasions lead to hair-raising situations, especially when you land in zero-visibility weather! I suggest using IAPs and airport charts made from FS .BGL data, but then again, it is up to the user.

Flight Plans

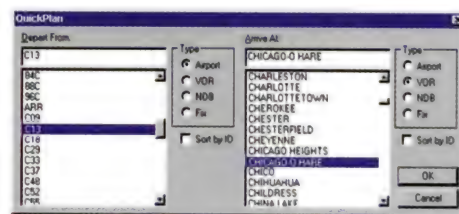
A flight plan is created by using either the quick plan or plotter options. Quick plan generates a flight plan between any two points using airports, nav aids and fixes as departure and arrival points. You can also use the AutoRoute option, providing you have defined your auto route options (transmitter range, route deviation). Once done, you may manually edit your flight plan in map mode. The other way to plan a flight is by using the plotter: just point and click! The flight plan can be saved and recalled for later use.



Waypoint	ID	Elev	Position	To Next Waypoint		
	Freq			Course	Distance	Comments
Waypoint	WPT	650	N 41° 51.9'	017T	3.1 nm	
			W 87° 36.4'	010M		
LORAH	LORAH	650	N 41° 54.9'	179T	6.5 nm	
FIX			W 87° 35.2'	180M	3.1 nm	
BEDEZ	BEDEZ	630	N 41° 48.4'	178T	1.7 nm	
FIX			W 87° 35.1'	179M	9.6 nm	
NILES	NILES	630	N 41° 46.7'	090T	4.3 nm	
FIX			W 87° 35.0'	091M	11.3 nm	
CRIBB	CRIBB	630	N 41° 46.7'	013T	12.1 nm	
FIX			W 87° 29.3'	015M	15.6 nm	
WILLA	WILLA	650	N 41° 58.5'	275T	7.4 nm	
FIX			W 87° 25.7'	276M	27.7 nm	
LAIRD	LAIRD	650	N 41° 59.0'	270T	3.2 nm	
FIX			W 87° 35.6'	271M	35.1 nm	
EBENS	EBENS	650	N 41° 59.0'	270T	5.6 nm	
FIX			W 87° 39.9'	271M	39.2 nm	
TAFPS	TAFPS	650	N 41° 59.1'	266T	5.3 nm	
FIX			W 87° 47.3'	267M	43.8 nm	
ORD	ORD	669	N 41° 58.7'			VOR ORD 113.90
		135.40	W 87° 54.4'		49.0 nm	

For Help, press F1

1:100000 42° 02' 00.03" N 87° 57' 53.57" W



QuickPlan

Depart From:

Arrive At:

Type: ☐ Airport ☐ VOR ☐ NDB ☐ Fix

Sort by ID

Once the flight is planned, you will find that when clicking on a plotted waypoint, you can no longer get info on it. Furthermore, any attempts to gather info on any nav aid/fix/airport that is very close to a plotted waypoint (VOR, NDB, FIX) will result in the plotted line moving to that nav aid. The work around for this is to disable the waypoints option from the **Display** menu. You should obtain your waypoint information before or after plotting your flight, and not while flying.

Viewing the flight

Using the GPS track and position options, you can monitor your flight on the map. The map can be auto centered, so you will not need to use the scrolling bars to center the screen. If not already done in the

Preference menu, remember to set your viewing options so that your map will not be cluttered with unnecessary details. The GPS preference tab of the **Preferences** menu allows you to define the track update (1 to 60s), magnetic heading, nav aids and fix ranges and sorting preferences.

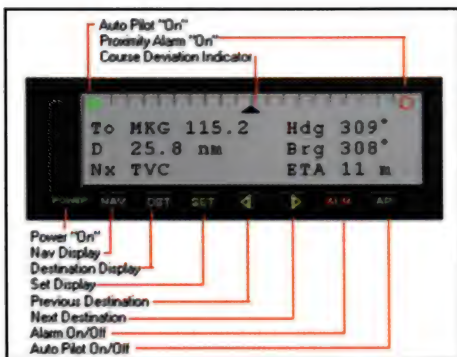
The experienced pilots will take great pleasure in seeing how good (or bad) they are at tracking radials and performing various other navigation niceties.

The Approach Plates

The approach plate shows all necessary information that can be found on a real Instrument Approach Procedure (IAP). The only twist to "reality" is that you can reverse the generic holding pattern and modify Final Approach Fix (FAF) and Decision Height (DH) values (DH is given both as altitude and height above ground). In this example, FAF is 2,150 ft (ORD 5.2).

FS 98 GPS Gauge

When running FS 98, the handheld GPS window will load with the panel it has been installed to. You can close the GPS window by right-clicking on it and activate it through the View menu. By default, the GPS window will be docked; it can be undocked should you need to move it to another location.



The GPS has three display buttons: Nav, Dest and Set, two arrows for Next and Previous waypoint, a "five nm to waypoint" visual alarm, the GPS/AP toggle button (heading and altitude hold only), and the Course Deviation Indicator (CDI).

The Nav window displays information on your current location, heading, speed, altitude (when on the ground: +3 ft in the case of the Cessna) and To "waypoint." The destination (DST) window displays information on To/Next waypoint, distance to current waypoint, ETA to waypoint, your current heading and waypoint bearing.

You can use the "Set destination" option and choose a single waypoint (airport, nav or fix) or the whole flight plan. Flight plan waypoints are automatically updated in the GPS when autopilot is engaged with the GPS gauge, and if you lack navigational skills, you should use it for the enroute phase of the flight.

When choosing the "Flight Plan" option in "Set Destination," the GPS will auto-switch to the next waypoint 2.5 nm before you reach the current waypoint. This leaves you with several seconds to go before reaching the waypoint when the CDI needle already points in the direction of the next waypoint. At the end of the flight, the actual flight track will be off course and inside the planned track. This is particularly true if the waypoints and fixes are in a small flight area. Not convinced? Try this sample flight:

Meigs, LORAH, BEBEE, CRIBB, WILLA, LAIRD (IAF), EBENS, TAFS, R27R (ILS I-AC 110.5).

Experienced pilots may use a stopwatch and continue to the current waypoint, then head for the next. When the waypoint is a fix, nothing prevents you from using the associated VOR radials and DME to know when you are over the fix.

You'd think you would be able to use the Previous Waypoint button once the GPS has switched to the next waypoint: no. When the GPS loads the next waypoint in memory (2.5 nm before reaching current waypoint), you will not be able to use the previous waypoint button until you are 2.5 nm away from that waypoint.

Using the "Flight Plan" option of "Set Destination" that includes departure/SIDs and Arrival/STARs waypoints may lead the inexperienced pilot to some gross flying errors, since these two phases

require accurate navigation. You can start plotting your flight after a SID and before a STAR since all the waypoints you need are listed in the "Set Destination" window. When the SID is completed, you may then load the "Flight plan" until you need individual waypoints for your STAR. You can, of course, plot the whole flight from departure to destination, print the flight plan and delete the departure/SID and Arrival/STAR points.

Tips

- ✈ You can import files in *.DAT format and save as *.MAP (prefer the 1:1,000,000 or 1:2,000,000 map scale).
- ✈ Unless you reserve the flight plan for the enroute phase, that last waypoint will be located somewhere in the middle of the airport. If you plan on having the very last GPS point dead on the arrival runway, insert a waypoint on the runway of your choice and delete the previous waypoint.
- ✈ Waypoints will snap to any fixes, airports and nav aids. If you wish not to have the waypoint snap to a particular fix/airport/nav aid, insert another waypoint close to it and delete the other or drag the waypoint elsewhere.
- ✈ Some people have reported that the handheld GPS window expands to the full window size. This is caused by the window ident= identifications in the PANEL.CFG file where the GPS gauge window was installed. This happens if there is no clear differentiation of the ident= identifier for each panel window described in the PANEL.CFG file. Many panels have all windows identified as ident=0, or just as ident=. If they are numbered sequentially, i.e., ident=10, ident=20, ident=30, the problem will be avoided.
- ✈ Abacus has made a new GPS install and gauge available on their FTP site that will allow the user to include the GPS gauge on both default FS98 and converted aircraft. Go to <ftp://ftp.abacuspublisher.com/pub/copilot.gau> if you do not intend on including the GPS to converted panels or to <ftp://ftp.abacuspublisher.com/pub/cpgpsin.exe> if you intend on including the GPS to both default and converted panels. You should run this version of CPGPSIN.EXE over a clean install of CoPilot; otherwise, you may get errors.
- ✈ It has been reported that Hercules Stingray video card users may experience lockups when zooming in map mode. This is caused by PROMTN.DRV. You need to get a new video driver (V1.33 or higher) from the Hercules Web site at <http://www.hercules.com>.

Conclusion

Abacus's Copilot v1.1 was the very first moving map and GPS program for Flight Simulator that did not require another computer. CoPilot 2.0 includes several new features that really add to the Flight Simulator experience. While flight simmers outside the States may not be too happy because there are no fixes for their countries, the upgrade to CoPilot 2.0 for FS95/FS98 is well worth the small financial investment.

Product Reviews

Reviewed In This Issue Are:

The Planes of Airbus

Air Force One

Aviator Theme Park - Munk Canyon

Chicago O'Hare International

CH Products Gamestick 3D

Set Your Compass and Fly

The Planes of Airbus

Scott M. Slaughter

Last spring Alpha Software announced a new add-on product for Microsoft Flight Simulator 98 called **The Planes of Airbus**. I was anxious for this add-on especially considering that it's always good to fly something than the default Boeing heavies. **The Planes of Airbus** will let you experiment with several aircraft from Airbus Industrie, the world's second largest aeronautics manufacturer.

The marketing and graphic artists at Alpha Software did an excellent job on the package. I know what's involved in designing, creating and producing a cover like this so I can appreciate their efforts. However, when I opened the package, I found only a CD-ROM, jewel case, manual and a registration card. A lot of packaging for a few items but that's not unusual for software — it's called M-A-R-K-E-T-I-N-G.

Also, the program manual cover doubles as the jewel case cover. At first this worried me...how small could the print be in manual only a few inches wide and high? And that's not to mention how much information could there be in such a small manual. Fortunately, I did not need a magnifying glass. The manual, although small, mentions what you need to know to use the program. This includes installing and uninstalling the program, keyboard shortcuts, loading scenery and more. I didn't have any problems installing **The Planes of Airbus** although there was no chance for a custom installation. However, this is not a major

problem. The program is not a space hog (requiring only 16MB of free hard drive space). Besides, you'll probably want to fly all the aircraft anyway.

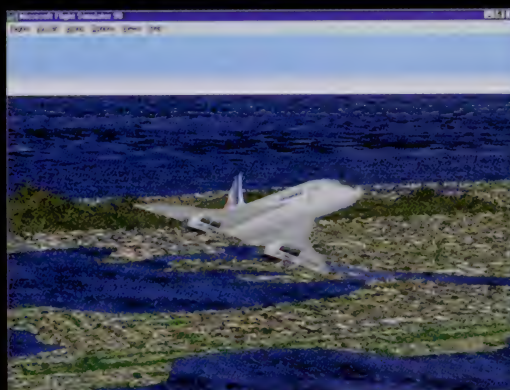
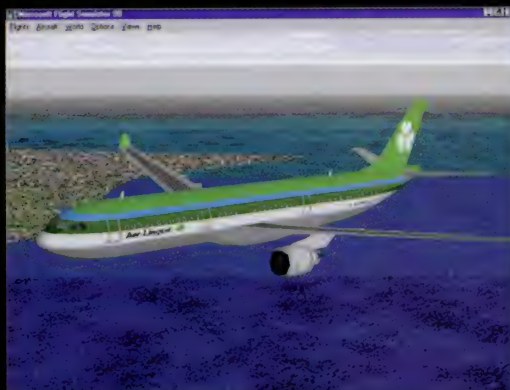
Alpha Software recommends using the Windows 95 Control Panel to uninstall the program. This method did work to uninstall the FS98 version (although it did uninstall the complete program). However, I did not find a suggestion in the manual to uninstall either the FS95 or FS 5.1 version. So you may be on your own to uninstall those versions properly.

The Planes of Airbus includes 44 of the Airbus heavies. You can pilot 12 Airbus models: Airbus A300, A300-600F, A300-600ST (Beluga), A300B4, A310-200, A310-300, A319, A320-200, A320-300, A330-300, A340-200 and A340-300. As a bonus, Airbus also has four Concorde planes: Concorde 001, Air France, British Airways and the rare Singapore Airlines/BA livery Concorde.

Regardless of the add-on or program that your're using in Flight Simulator, it's always a good idea to select the **Aircraft | Select Aircraft** command and read the "Description" information. In this case, the "Description"



Product Reviews



Examples of the aircraft in the Planes of Airbus include the Airbus 319 (top left), Airbus 320 (top right), Airbus 330 (bottom left) and the Concorde (bottom right).

The Planes of Airbus includes 12 Airbus models: Airbus A300, A300-600F, A300-600ST (Beluga), A300B4, A310-200, A310-300, A319, A320-200, A320-300, A330-300, A340-200 and A340-300. As a bonus, Airbus also has four Concorde planes: Concorde 001, Air France, British Airways and the rare Singapore Airlines/BA livery Concorde.



The Planes of Airbus includes a Lufthansa 340-300 (left) and a Canadian 320-200 (right).



information told me that all the aircraft were designed in 1996 — over two years ago. This places the planes back to the days of FS95.

The textures were accurate but I've seen better, which gets back to the age of the aircraft. Flight Simulator has made too many improvements — for example, FS98 and 3D — in the last few months so you won't find the detail in **The Planes of Airbus** that you'll find in more current packages (such as VIP and others).

The older aircraft are by themselves not a major problem. What is more troublesome is the package said **The Planes of Airbus** includes "photo-realistic, working gauges, instrument panels and engine controls." However, I didn't find them in the program. Most obvious is that **The Planes of Airbus** uses the default FS98 Heavy Jet (737 - a Boeing, not Airbus) panel. This is also true for the four Concorde aircraft.

But the scenery included with **The Planes of Airbus** is impressive. It covers several miles surrounding the Toulouse-Blagnac airport in France. The Toulouse airport is the home of the Concorde and other classic planes such as the Caravelle, Dassault, Devoitine and Latecoere. The **Planes of Airbus** provides photo-realistic scenery of runways, airfields and the surrounding countryside, as well as night illumination of this illustrious destination.

The package includes two adventures. They involve flights into Toulouse-Blagnac airport from different directions and under different conditions. These can be quite challenging. The User's Guide makes it easier by including a pre-flight briefing and small sectional.



All ATC calls in the two adventures are in French so it's fortunate your copilot speaks French. To add more realism, since you are flying around in France, most of the other air traffic chatter is also in French.

The program is available for FS 5.1, FS95 and FS98. (The FS 5.1 version is a bonus, perhaps even an afterthought since no mention of FS5.1 appears on the package.) It's comes on one CD-ROM.

The Planes of Airbus also includes the Microsoft Converters and Patches for FS95 and FS98. The CD-ROM will install the files for FS95 and FS98 but you'll have to do the FS 5.1 installation manually (if you're still using FS 5.1). Installation instructions are included in a README file. Also, if you are still using FS 5.1, you'll also need BAO's (Apollo's) Flight Shop to use the adventures and the aircraft.

The final line for the package is to consider **Planes of Airbus** if you're a hard-core Airbus fan or need good to excellent scenery/adventure/sound files for southern France.

For More Information

Alpha Software
168 Middlesex Turnpike
Burlington, MA 01803
(781) 229-2924
(781) 272-4876 (fax)
www.alphasoftware.com

Air Force One

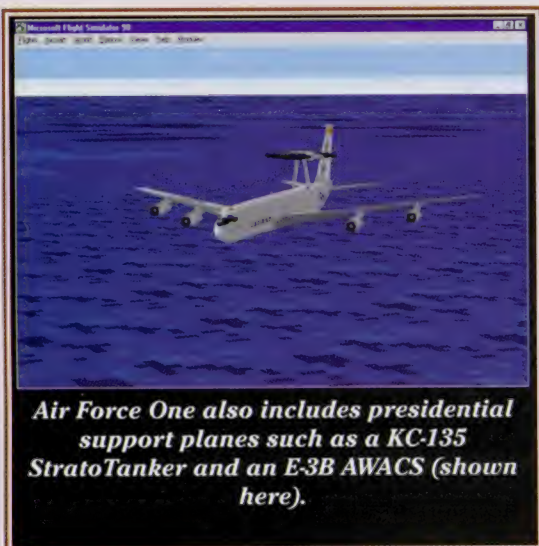
Brian Howard



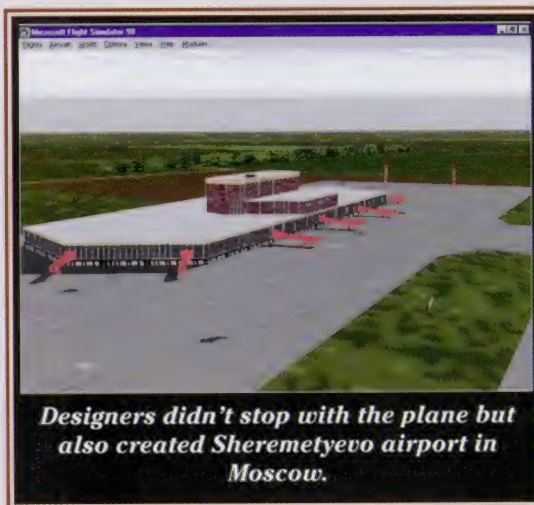
As if the president doesn't have enough problems, now there's a rookie at the helm of his "Flying White House." Alpha Software, Data Becker and Sky Design offer you the opportunity to pilot the most exclusive airplane in the world: Air Force One (AF1). The real-world pilots must be hand-picked by the United States Air Force and Secret Service. You just need a PC.



Air Force One features five historic presidential aircraft including this one, inaugurated by former president George Bush.



Air Force One also includes presidential support planes such as a KC-135 StratoTanker and an E-3B AWACS (shown here).



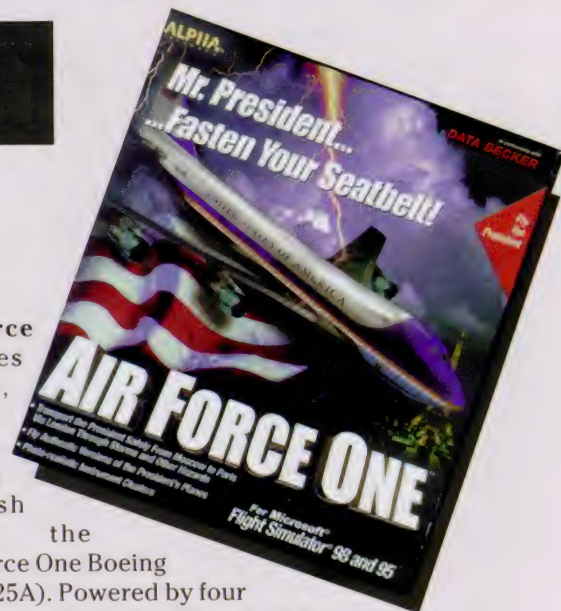
Designers didn't stop with the plane but also created Sheremetyevo airport in Moscow.

Air Force

One features five historic, big Boeings. Former President George Bush inaugurated the current Air Force One Boeing 747-200B (VC-25A). Powered by four GE CF6-80 engines, this bird has a 59.6m wingspan (covering 511 square meters) and stretches 71m long. Boeing 707s transported Eisenhower, Kennedy, Johnson and Nixon. Alpha's **Air Force One** also includes presidential support planes: a KC-135 StratoTanker, to make those long flights even longer, and an E-3B AWACS, to keep the skies safe for the president.

The international team of designers, including a former AF1 pilot, employed the most current technology to craft 3-D structured landing gear, including elbow struts and torsion scissors, and active landing lights that illuminate the ground at night. The planes look great from the outside, and the panels are very nice inside. FS's **Views | Instrument panel...** submenu lets you enlarge particular areas of the panel. This is useful for close-ups of cockpit procedures, especially on small screens.

To better recreate the actual AF1 experience, the designers didn't stop with the plane. They also created Moscow's Sheremetyevo airport and created a full-scale adventure, in which you are assigned a Special Air Mission to take the president from Moscow to Paris, via London. This adventure includes 170MB of sound files, many based on original sound recordings from a Boeing cockpit.



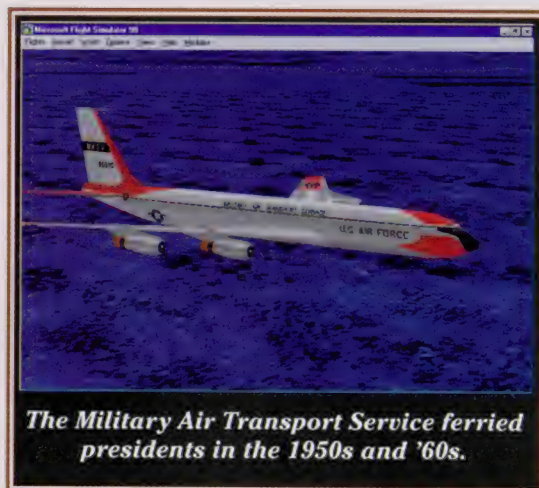
The installation browser program lets you install each component individually and automatically locates your FS folders, though you manually enter the scenery into FS's Scenery Library. This browser also showcases detailed information about the planes and Sheremetyevo airport, a photo gallery and live Internet links (e.g., Boeing and USAF).

The detailed manual fully explains the history and evolution of presidential air travel, beginning with Eisenhower's 1959 flight into Germany.

Ike wasn't the only important person on board, however. The manual also lists all the commanding pilots Air Force One has had over the years. It also explains what it is like to be in the cockpit, instructing you in the panel and the proper scan sequence, as well as providing checklists, conversion tables, and approach plates for London, Paris and Moscow, where AF1 is a frequent visitor.

Twenty-three members of the USAF's 89th Airlift Wing crew Air Force One. The president arrives at Edwards AFB, AF1's home base, aboard the Marine One helicopter, with 60 advisors, assistants and coordinators in tow. AF1 hosts ten cockpit crew: four active officers and one replacement crew, plus two stand-by pilots. Ten more members crew the cabin, which features custom partitioning and internal outfitting, not to mention the ultra-modern technical equipment.

The most powerful man in the world needs constant communication around the world. Three Air Force Technicians control 85 tap-proof phones, 19 televisions (eleven video recorders) and miscellaneous computers and cryptographic equipment from the AF1 communications center. AF1's conference room seats eight in leather chairs



around the large table. The inner sanctum, the Presidential Suite, has living, bedroom and changing areas, a washroom, a shower and a separate toilet.

Overall, this is a good package, offering very nice airplanes and a well-researched manual, but it also has drawbacks. The descriptions of the saved flights that appear in FS's **Flight | Select Flight...** menu should have been translated from German. The same is true for parts of the prepared Moscow to Paris flight adventure. And speaking of this adventure, it appears to have been well planned, offering several

difficulty and involvement levels, but I was never sure what controls were my responsibility and which were in the programmers' control. In Alpha's defense, however, virtually every MSFS adventure I've explored has performed poorly.

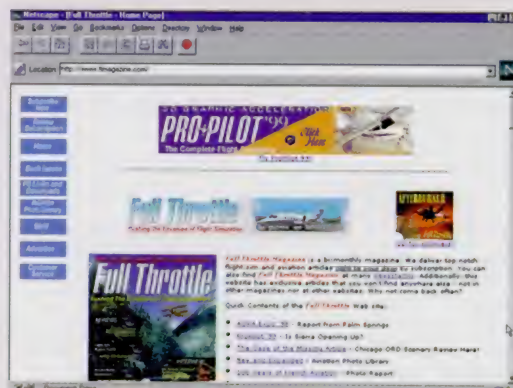
So, with that minor caveat, this isn't an add-on that everyone must bring home, but if you like flying jumbo jets or the excitement of being the president's aerial chauffeur, you will want the planes of **Air Force One** in your Flight Simulator.

For More Information

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www.alphasoftware.com

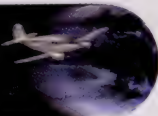
Full Throttle Website

Don't forget to visit the Full Throttle website (<http://www.ftmagazine.com>). Check out the back issues and other information and files that are available on the website.



Aviator Theme Park - Munk Canyon

Scott M. Slaughter



I was skeptical when I heard about the Canyon Scenery from Munkworks. The price alone (\$12.00) made me nervous — how good could this program really be? However, I was very surprised. The Munk Canyon is like something you've never seen before in Flight Simulator. It appears like a *true* canyon. It's impressive even on a normal 2-D graphics card and even more impressive on a 3-D card. This scenery, based on photographs of real mountains, is both original and fabulous.

Munk Canyon is one part of the Aviator Theme Park from Munkworks that will take you into a virtual fantasy world. (Although this Aviator Theme Park is imaginary, it's set in eastern Atlantic near the Canary islands.) The other three parts include Munk Jungle, which is good for VFR flying with its small, island-like scenery. It includes animals, trees, cliffs, a waterfall and more. An excellent program for "virtual" aerobatics pilot training is Munk Metry. The final part is called Munk Sand. It's an obstacle course set in the ocean.

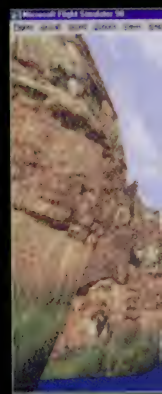
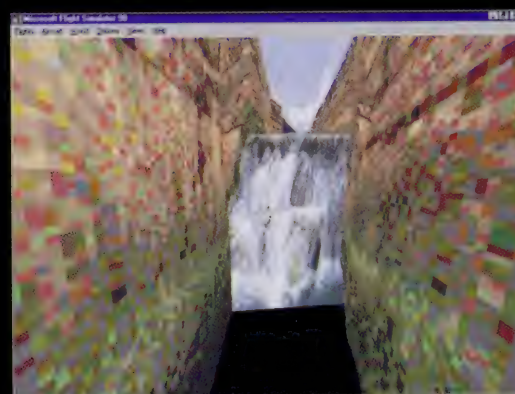
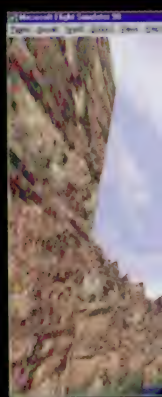
Munk Canyon, the one we'll look at here, is arguably the most impressive of the four. You must fly inside the canyon to see it. In other words, you cannot fly "above" the canyon and look down. I was so impressed by the scenery that I spent more attention to the waterfalls and cliffs than I did piloting my aircraft. Even when concentrating, I found it that it required patience, skill and courage to fly through this challenging canyon. I first used the FS98 default Cessna and then the Abacus Flight Deck F/A-18.

You'll must the skill to make the frequent turns to avoid the jagged cliffs and snow-covered rocks. If you think you can land a plane anywhere, try landing on a small narrow airstrip in the middle of a mountain. The program features two helipads and three runways along the canyon. Just always remember that mistakes are not allowed. You'll crash if you hit the walls in the Canyon. (And yes I can say it happened to me many times.)

Installation

Installation is fairly straightforward and simple. This is especially true if you've installed scenery before (although it may seem slightly overwhelming if you have

never installed scenery). Copy the .BGL files in the SCENERY folder and the other files to the TEXTURE folder. Make certain to read the README.TXT that comes with the download. It will explain the installation procedure and provide information on the runways and other flight information.

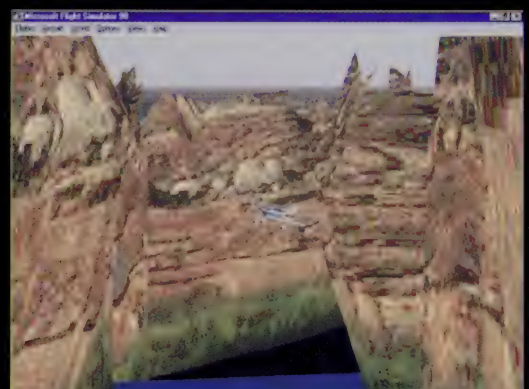
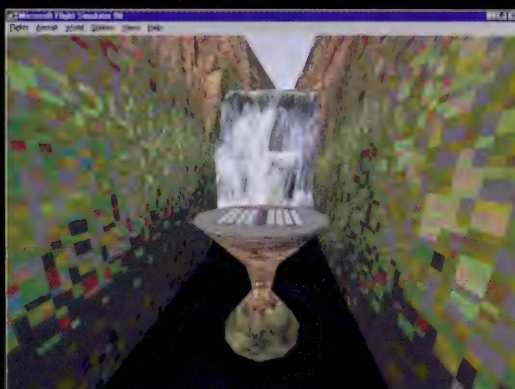
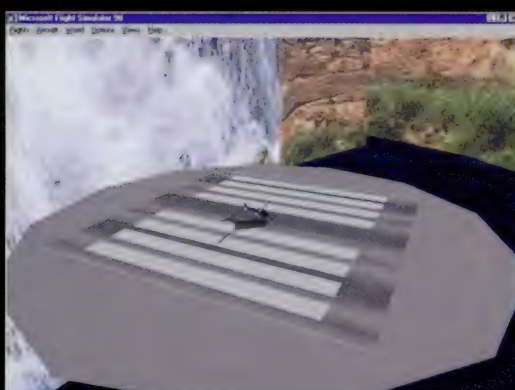
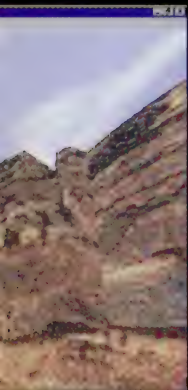
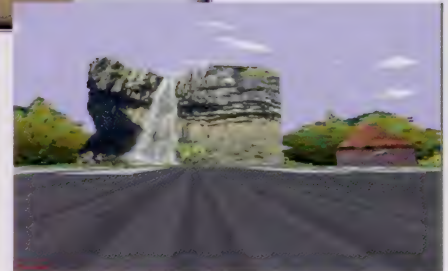


**Example scenery from Canyon
Scenery by Munkworks**

Final thoughts

Seriously consider Aviator Theme Park as a holiday gift - especially for yourself. Aviator Theme Park is shareware. The price of the entire Aviator Theme Park is only \$25.00. However, you can order only the parts you like. The price of Metry and Sand are \$7.00 each. The price of Jungle and Canyon are \$12.00 each. It's a true bargain - something very difficult to find today. If you don't believe me that Aviator Theme Park is something you should have, download a demo. It features a piece of Munk Canyon so you can get a feeling of what it's like.

For more information on Canyon Scenery and the Aviator Them park, visit the Munk Works home page (<http://pages.infinit.net/munk/home6.htm>).



Chicago O'Hare International Airport

FS98 Add-on Scenery by Christopher Gilbert

Tim Dickens



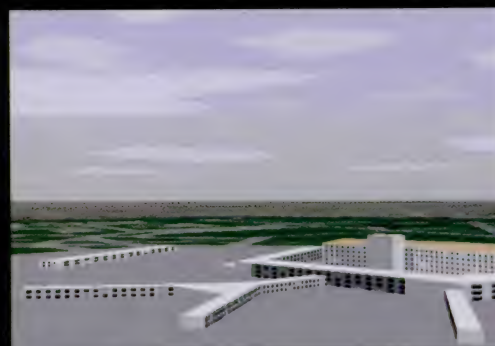
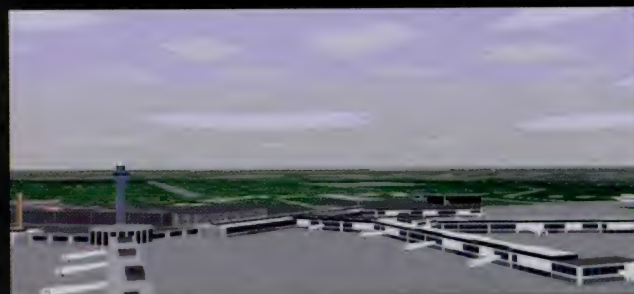
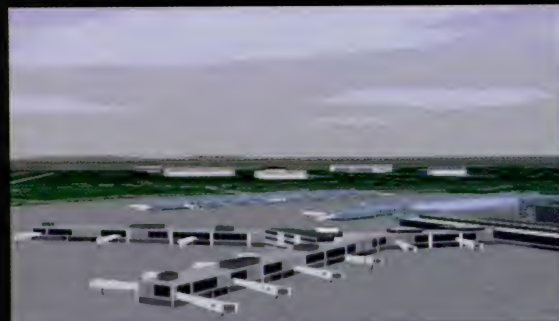
If Chicago O'Hare (KORD) is one of your regular FS 98 destinations and you have not yet added this excellently detailed scenery created by Christopher Gilbert, then run (do not walk) to your computer and download this scenery enhancement!

I consider myself an expert on the real-world O'Hare. During my misspent youth, I lived in the Chicago area (until 7 years ago) working a job that required frequent air travel. I was flying out of and into O'Hare so often that they were considering giving me a permanent parking space in remote lot D. I can draw you a map of it on a napkin if you'd like. So, I have never been impressed by the default Microsoft FS versions of the virtual KORD. Even though the last two incarnations of FS have added more detail here, it still does not look anything like O'Hare.

When I discovered this add-on scenery enhancement, I downloaded and installed it immediately. At first glance, my eyes almost popped out. Wow! This is O'Hare! Viewed from above and on the ground, this scenery enhancement is accurate to the nth detail.

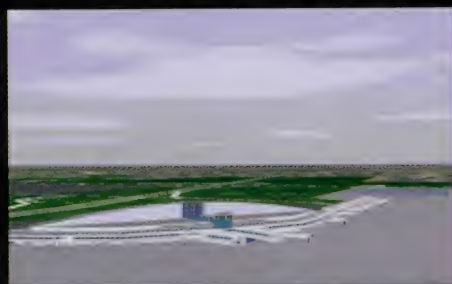
The best examples are these screenshots of the terminal area, before enhancement and after.

As a creator of custom scenery and 3-D objects myself, I appreciate the hours of work that Chris Gilbert put into this project. The quality of the 3-D objects is absolutely top notch! There is no bleed-through from any angle, and



Images this page:

(Top) Default FS 98 terminals E & F, B & C; (top, middle) Control towers and terminals H & K; (bottom, middle) Terminals E & F appear in the foreground and the United terminals B & C appear in the background; (bottom) International Terminal at O'Hare



everything is to scale and absolutely authentic. The international terminal is the best example, because its size and shape make it difficult to build.

Even the outbuildings and hangers are reproduced with authentic detail. Taxiing to the runway and rolling past accurate representations of the actual buildings, instead of generic FS-style buildings, greatly enhances the simulation experience. If you feel like I do, you will really appreciate the hours of work Mr. Gilbert put into this for all of us to enjoy.

So what's the catch? Well, it really doesn't have any. This much detail will impact your frame rates, but this is to be expected. On my system (233-MHz with a Diamond Stealth 4 MB 3-D card) the frame rate dropped from approximately 25 fps (default) to around 11 fps on approach, with the scenery complexity set to dense. I consider this very acceptable for scenery having this level of detail.

One thing that Chris Gilbert did to relieve users with less powerful systems is that he added detail at different complexity levels. This will allow you to turn down the scenery complexity to dense or normal in order to get respectable frame rates, while still seeing most of the important scenery details. There are quite a few (sloppy) scenery designers who fail to do this, which will result in unusable frame rates for users who do not have one of the newest muscle PCs. Another thumbs up here to Mr. Gilbert.

Installation of the scenery is quite simple. You need to install this enhancement package in a separate directory, just as you should any add-on scenery. Then add it in your FS 98 scenery library at a priority layer higher than the default Chicago and USGL (US Great Lakes booster files). The *exclude file* will then be able to remove the default FS 98 scenery detail in favor of these improved versions. It includes 2.5 MB of custom textures, which you can install either in a local Texture directory with the scenery or in the main FS98\Texture directory. That's all there is to it. The runways and nav aids remain the same as the default. Make the new scenery active in the FS 98 scenery library and you are ready to fly! Make sure you have Microsoft Patch 1 installed on your system. This is critical, because it expands the scenery memory buffer to 512 K (from 256 K), so that FS 98 will display all of the objects in this scenery,



as well as many other add-on scenery packages. If you do not have this patch installed, you can find it at <ftp://ftp.microsoft.com/deskapps/games/public/flightsim/fs98pat1.exe>.

If you are new to scenery installation, the tutorial on our Web site (<http://www.ftmagazine.com>) will guide you.

This is a must-have scenery add-on for everyone who frequents Chicago O'Hare. The authenticity and attention to detail is well worth the slight degradation in frame rate performance. Now you can enjoy the experience of flying to and from O'Hare the way it should be—*realistic*.

For More Information

Chicago O'Hare International Airport Illinois-Version 1.0

For Microsoft FS 98 Only

Freeware

By Christopher Gilbert

File name ORDOHARE.ZIP-353 KB file size

Available from:

Iup.edu at: <ftp://ftp.flight-sim.iup.edu/flight-sim/uploads/ordohare.zip>

Flightsim.com at: <http://www.flightsim.com> (select Search File Libraries for ORDOHARE.ZIP)

CH Gamestick 3D

Brian Howard



Oooh, I'm a lucky boy! And not just because I have loving family and friends, a solid roof and three squares a day. On top of all this, I also recently received the latest joystick from CH Products: **CH Gamestick 3D**. This eight-button, four-axis joystick has brought a new level of realism to my flight simming—no more keyboards for me!

I've wrestled with installing joysticks from several big-name manufacturers in the past, and although none of those were from CH Products, I wasn't expecting anything different this time. However, CH really knows what they're doing. After inserting the joystick's plug into my soundcard's game port, loading the drivers from the included diskette and running through Windows's calibration Wizard, the Gamestick 3D performs wonderfully.

"Now what," you may be asking yourself, "sets the Gamestick 3D apart from so many other joysticks I see on store shelves?" Well I'm glad you asked. Of course, the Gamestick 3D includes features you'll find on other high-end controllers, such as sturdy construction, programmable buttons and a throttle slider. But unlike the others, the Gamestick 3D has a twisting handle Z axis, a contoured base, a long, seven-foot cable and—attention lefties—it is wholly ambidextrous. The centrally located buttons and throttle and a symmetrically modeled grip allow the Gamestick to be comfortably handled by right- and left-handed users.

The long connecting cable means I don't have to sit on top of my computer to use the Gamestick. The solid base has a concave underside, making a perfect fit on my leg. My joysticks usually end up in my lap rather than on top of a table (which is usually too high for a joystick) anyway, and the Gamestick 3D's contoured base sits solidly and comfortably on my leg.

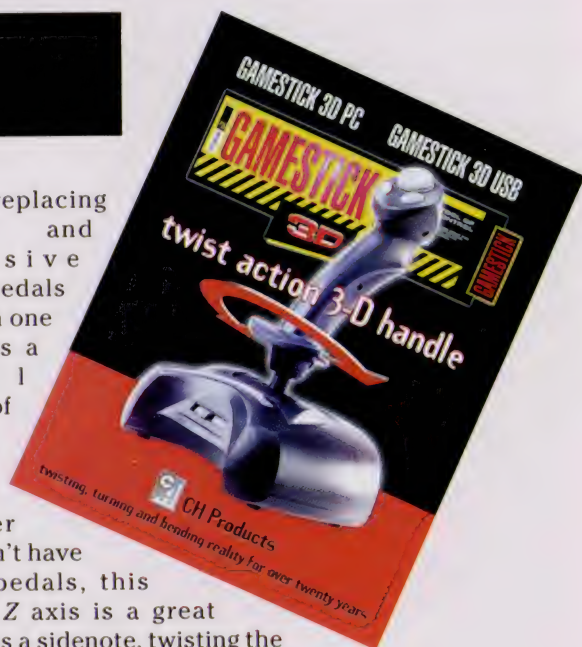
The stick itself can be twisted clockwise and counter-clockwise. This is very useful for controlling a simulated aircraft's

rudder, replacing bulky and expensive rudder pedals (although one sacrifices a small amount of realism). Since most computer pilots don't have rudder pedals, this twisting Z axis is a great bonus. (As a sidenote, twisting the stick is a great way to "strafe" in action games).

The shipping version of the Gamestick 3D will also include a programmable "Gamecenter" GUI interface for Windows 95/98. Besides allowing you to program specific functions to the Gamestick's buttons, it will also allow you to save several joystick configurations and associate them with different games and simulators. For instance, you may create one configuration for Flight Simulator and a slightly different one for Combat Flight Simulator. The Gamecenter will save these configurations and automatically select the proper one when you launch one of the programs.

The version I have plugs into the gameport on my computer's soundcard. The Gamestick is also available for a USB connection, for Sony's remarkable Playstation and soon in a wireless configuration that promises to have a range of 70 feet, without requiring a direct line of sight, which will even allow you to play around the corner from the signal receiver. The CH Gamestick is compatible with the other sticks in CH's product line.

The CH Gamestick 3D deserves high marks for its comfortable, ergonomic design, the ease of setup, the Gamecenter configuration software and the several versions in which it is available. I tested it with several applications, primarily Microsoft's new Combat Flight Simulator, and it performed



well with them all. The Gamestick doesn't support Force Feedback, which would significantly raise the cost. If I had my druthers, it would offer more resistance but I prefer stiffer joysticks than other gamers so this won't be a drawback for most users. At \$49.95 retail, the Gamestick 3D is the controller I recommend. It's relatively inexpensive, very reliable, very versatile and, most importantly, very comfortable.

Features

- ✦ Eight button functions: a trigger, three fire buttons and a four-way hat switch
- ✦ Four axes of control, including 3D twist-action handle

- ✦ Ergonomic handle and base
- ✦ Ambidextrous design
- ✦ Programmable Win 95/98 CH Gamecenter software
- ✦ Trim controls

For More Information

CH Gamestick 3D
CH Products
970 Park Center Dr.
Vista, CA 92083
800-624-5804
www.chproducts.com

Scenery Singapore

Adam Howe

Welcome to Singapore! **Scenery Singapore**, by LAGO, gives all flight simmers the opportunity to fly in Singapore and southern Malaysia. Normally in reviews, I provide an Abacus CoPilot rendition of the scenery to show exactly how much area the scenery covers. In this case, I could not get an accurate display of the scenery because there are only four airports plus a carrier take off.

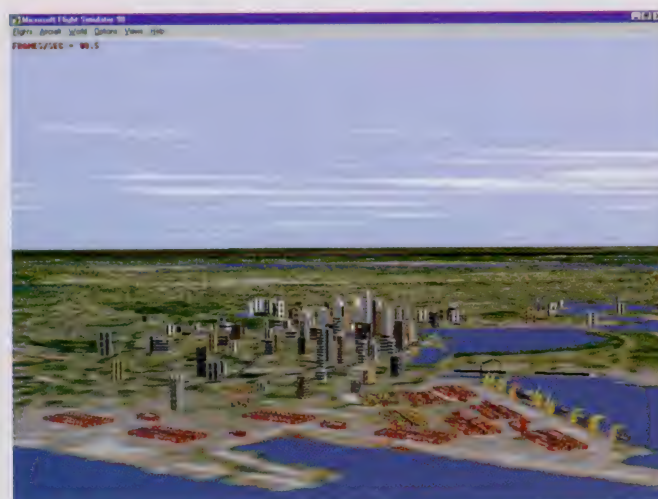
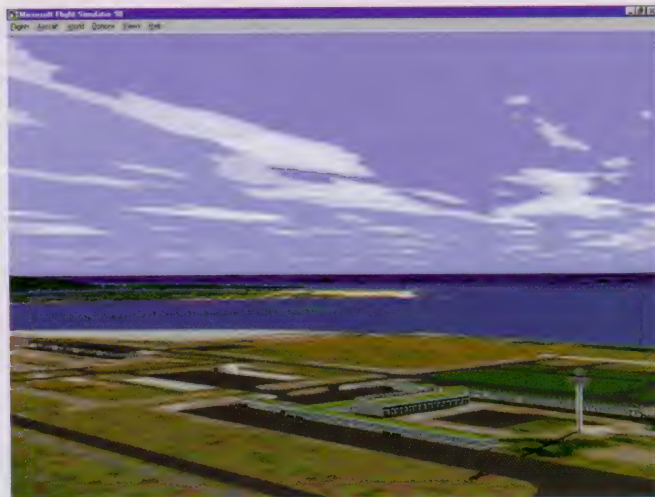


The Flight Crew created a unique scenery that is quite detailed. The package makes a great addition to any Flight Sim collection.



Scenery Singapore contains four airports plus the carrier, each detailed with beautiful buildings and texturing effects. The package covers more than 7,000 square kilometers and is accurate to 10 meters per pixel. According to the package, there are 400 new buildings and objects in the Scenery Singapore package (too many for me to count!), which includes dynamic scenery that adds a lot of realism to the scenery.

Product Reviews



Fully functioning docking light systems at the larger airport terminals make you feel like you are there (and not in front of your computer on a Saturday night playing Flight Simulator)! Seven situations are also included with the package, ranging from taxiing to a takeoff, to autopiloted landings and site-seeing tours, and even a carrier landing to test your skills.

I found the frame rate a bit sluggish (only 3.5-8 f/s) running on a Pentium 200 with 32 MB of RAM, but this can be increased by running it with a good 3-D card or graphics accelerator, as with a lot of FS add-ons. I would add a nice 3-D card to the list of recommendations. The scenery is detailed and great to look at. I would have liked to see a bit more coverage, but what is here is great. Installation was a breeze. With the autorun on, all I had to do was insert the CD-ROM and click a few buttons, and the scenery was installed in minutes and already added to the FS Scenery Library—much better than adding it manually.

For More Information

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<http://www.logoonline.com>

Scott M. Slaughter



The tables in *Set Your Compass and Go* are easy to read and follow. The book also lists the distance between airports and time required to fly to those airports.

The publishers wisely went with a spiral spine so the manual sits nice and flat on my desk leaving my hands free to work with Flight Simulator. Although you'll see pages and pages of tables, *Set Your Compass and Go* also provides tips on flight simulation navigation, including VOR, ADF, radio and other procedures.

This is a book you should consider next to your PC when using Flight Simulator.

C. F. Moore & Co. Ltd.,
Denman Place Postal Outlet,
P.O. Box 47035,
Vancouver, B.C., V6G 3E1
Canada
Telephone: (604) 687-2924
Price: \$8.95 (US) or \$12.95 Canada
www3.bc.sympatico.ca/cfmoore/

If you need help in flying to another airport in the Northern Hemisphere (including Asia and Europe - not just

North America), consider *Set Your Compass and Go* by Frank Moore and published by C.F. Moore & Co. Ltd.

Set Your Compass and Go is organized into tables. Each world area has one table with 16 major airports. You'll find table for major U.S. central and eastern major airports. Also areas with two tables e for minor airports. ne table for each area. navigation tables for Africa and continuing Canada and the U.S.

airports. The western, central and eastern U.S. areas each have one table for major airports. Also mainland U.S.A. is divided into 28 local areas with two tables for each area, one for major and one for minor airports. Canada is divided into 16 areas, with one table for each area. The first part is divided into flight navigation tables for major airports in the Atlantic, Europe, Africa and continuing through the Northern Hemisphere to Canada and the U.S.

You'll start by selecting your departure and destination airports. I first used the information from page 38 to fly from Grand Rapids to Muskegon. Then look at the magnetic heading part of the table in the center of the page. Move down the column under your airport of departure ("Gr.Rap." in my example) and to the destination airport listed on the left (Muskegon Co.). The point where the row meets the column is the magnetic heading (303.08 in this example). Then shortly after take-off, set the desired heading and altitude in your autopilot and you are on your way.

HEADINGS IN THIS TABLE ARE FOR VMM® SIMULATORS
(For VMM simulator loadings apply column averages)

U.S.A. - DETROIT, MICHIGAN AREA										Major Controlled Airports					
		Airport		Batteries		Crews		Desert		Flt. Ops		Gr. Ops		Landing	
		Aircraft		Batteries		Crews		Desert		Flt. Ops		Gr. Ops		Landing	
		Aircraft		Batteries		Crews		Desert		Flt. Ops		Gr. Ops		Landing	
		Aircraft		Batteries		Crews		Desert		Flt. Ops		Gr. Ops		Landing	
		Aircraft		Batteries		Crews		Desert		Flt. Ops		Gr. Ops		Landing	
		Aircraft		Batteries		Crews		Desert		Flt. Ops		Gr. Ops		Landing	
		Aircraft		Batteries		Crews		Desert		Flt. Ops		Gr. Ops		Landing	
		Aircraft		Batteries		Crews		Desert		Flt. Ops		Gr. Ops		Landing	
		Aircraft		Batteries		Crews		Desert		Flt. Ops		Gr. Ops		Landing	
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Sample page from Set Your Compass And Go

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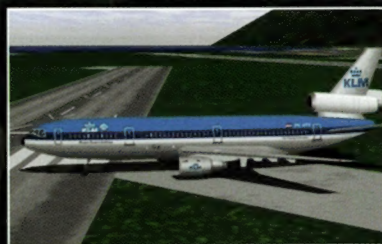
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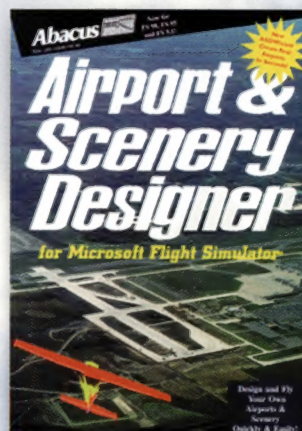
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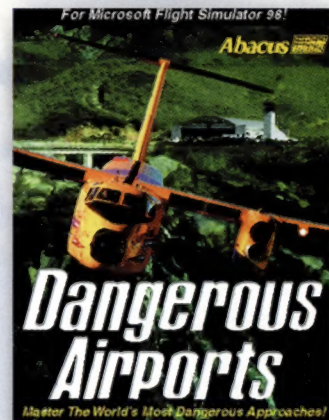
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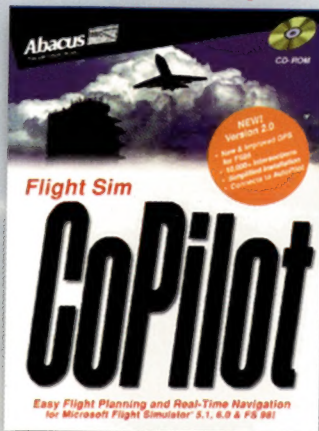
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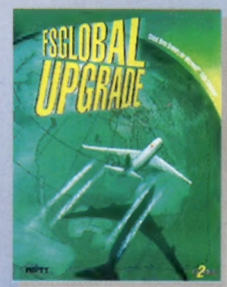
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